

Exhibit J

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
OAKLAND DIVISION

IN RE APPLE IPHONE ANTITRUST
LITIGATION

Civil Action No. 4:11-cv-06714-YGR

DONALD R. CAMERON, et al.

Civil Action No. 4:19-cv-03074-YGR

Plaintiffs,

v.

APPLE INC.,

Defendant,

EXPERT REPORT AND DECLARATION OF
RICHARD SCHMALENSEE, PH.D

August 10, 2021

CONFIDENTIAL DOCUMENT
Lodged Pursuant to Local Rule 79-5(c)-(d)

Table of Contents

I.	Background and Qualifications	4
II.	Assignment and Conclusions	5
A.	Two-Sided Transactions Platforms	6
B.	Market Definition.....	7
C.	Market Power.....	8
D.	Establishing Antitrust Injury to Individual Class Members	8
E.	The App Store in the But-For World	8
F.	Plaintiffs’ Experts Cannot Assess Harm to Individual Class Members	9
III.	Plaintiffs’ Experts Either Ignore the Fact that the App Store is a Two-Sided Transaction Platform or Generally Ignore the Implications of That Fact.....	10
IV.	Implications of the Fact that the App Store Is a Two-Sided Transaction Platform for Market Definition, Assessment of Market Power, and Antitrust Impact	17
A.	Implications for Defining Product Market(s)	17
1.	Developer and Consumer Plaintiffs’ Experts Ignore that Different Types of Transactions Face Different Competitive Conditions.....	17
2.	Professor Elhauge’s Hypothetical Monopolist Test Ignores Indirect Network Effects and Therefore Provides No Reliable, Relevant Evidence	32
B.	Implications for Assessing Market Power	40
1.	Implications for Assessing Market Outcomes	42
2.	Implications for Assessing Structural Evidence	49
3.	Implications for Assessing Aftermarket Claims	51
C.	Implications for Establishing Antitrust Injury to Individual Class Members.....	56
1.	Differences in Apple’s Complex Pricing Policies Between the Actual and But-For Worlds Must be Defined and Defended.....	58
2.	Output in the But-for World	59
3.	Measuring Harm to Individual Class Members	63
V.	Plaintiffs’ Experts’ Assumed But-For Worlds Are Inconsistent With Apple’s Basic Competitive Strategy and the Historical Evidence	65
A.	It Is Most Likely that in the But-for World the App Store’s Headline Commission Rate Would Be 30% and that Developers Would Use a Variety of Distribution Channels with a Variety of Costs.....	67
B.	It Is Most Unlikely that in the But-for World Apple Would Leave All Other App Store Policies, Apart from Commission Rates, Unchanged	73

1. Charging a percentage royalty for the use of Apple’s SDK or of Metal, as Epic charges royalties for the use of Unreal Engine..... 75
2. Change the number of tiers and commission programs..... 79
3. Change the ratio of the subscription rate to the main/headline rate..... 79
4. Introduce special discounts for limited groups of developers 81

VI. Plaintiffs’ Experts Have Not Demonstrated Antitrust Injury and Cannot Reliably Measure Harm to Individual Class Members 82

- A. Professor Elhauge 88
- B. Professor Economides..... 90
 1. Professor Economides’ Yardsticks 90
 2. Professor Economides’ Damages Calculations 94
- C. Professor McFadden 101
- D. Plaintiffs’ Experts Analyses Contradict Each Other..... 113
- E. Due to the Fatal Flaws Described Above, Plaintiffs’ Experts’ Analyses Cannot Reliably Estimate the Change in Total Output or Harm to Individual Class Members 121

I. Background and Qualifications

1. I am the Howard W. Johnson Professor of Management Emeritus and Professor of Economics Emeritus at the Massachusetts Institute of Technology (MIT), where I have taught industrial organization and related subjects since 1977. I served as the Dean of the MIT Sloan School of Management from 1998 through 2007. I was a Member of the President’s Council of Economic Advisers from 1989 through 1991. I am a Fellow of the Econometric Society and a Member of the American Academy of Arts and Sciences, and I was the 2012 Distinguished Fellow of the Industrial Organization Society. I have served as an elected member of the Executive Committee of the American Economic Association and am currently a member of the Executive Committee of the Board of Directors of the National Bureau of Economic Research. I have S.B. and Ph.D. degrees in economics from MIT. My Curriculum Vitae is attached as **Appendix A**.
2. I am the author or co-author of 13 books, more than 110 published articles, more than 35 book chapters, and many shorter papers. Since 1977 I have testified in a number of antitrust cases and related matters, including as Microsoft’s economic expert in *U.S. v. Microsoft*.¹ I have also testified before the U.S. Congress and state and federal regulatory agencies. In the last two decades much of my work, including my three most recent books, has focused on platform-based businesses, which are defined below. My work on multi-sided platforms was cited extensively in the Supreme Court’s recent *Amex* decision, discussed below.² A list of cases in which I have testified either at deposition or trial is attached as **Appendix B**, including my role as an economic expert in *Epic v. Apple* on the subjects of market definition, market power, and competitive effects in the context of two-sided platforms.
3. In forming my opinions, I have relied on court documents, data and documents produced by the parties, academic publications and textbooks, and other publicly available materials. These materials are cited throughout my report or otherwise listed in **Appendix C**. I am

¹ *United States of America v. Microsoft Corporation*, No. 98-1232, United States District Court for the District of Columbia, 1999.

² Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf. My work with Professor David S. Evans was also cited by the District Court and the Court of Appeals, and in the dissent.

being compensated at my usual rate of \$1,000 per hour for time I devote to this matter. I have been assisted in this matter by employees of the consulting firm Analysis Group, Inc., who worked under my direction, and I receive additional compensation in part based on their fees. My compensation in this matter is not contingent on the nature of my findings or on the outcome of this litigation, and I have no financial interest in the outcome of this litigation.

4. Since my work on this matter is ongoing, I may review additional materials produced subsequently to the issuance of this report, or conduct further analysis. I reserve the right to update, refine, or revise my opinions, or form additional opinions, including in response to other experts’ reports and any additional information I may receive.

II. Assignment and Conclusions

5. I have been asked by counsel for Apple Inc. (“Apple”) to provide an overview of the economics of two-sided platforms generally and two-sided transaction platforms specifically; apply economic principles to describe and evaluate whether the App Store is a two-sided transaction platform; and assess the economic impact of two-sidedness of the App Store on the allegations made by Developer and Consumer Plaintiffs. In particular, I have been asked to assess the implications of the two-sided nature of the App Store platform for analysis of market definition, market power, and competitive effects; Apple’s business justifications for the business model adopted for the App Store, as well as the determination and measurement of antitrust harm to developers and consumer class members.

6. I have also been asked by counsel for Apple to respond to portions of the expert reports of Professor McFadden,³ Professor Economides,⁴ and Professor Elhauge,⁵ as they pertain to issues outlined in the prior paragraph.
7. I make this declaration in support of Apple’s Opposition to Developer Plaintiffs’ Motion for Class Certification; Apple’s Opposition to Consumer Plaintiffs’ Motion for Class Certification; Apple’s Motion to Exclude the Testimony of Einer Elhauge, Nicholas Economides, and Christian Tregellis; and Apple’s Motion to Exclude the Testimony of Daniel McFadden; and Apple’s Motion to Compel Plaintiffs to Submit Trial Plan. The opinions expressed in this report are solely from the perspective of an economist addressing questions of antitrust economics. I offer no legal opinions or interpretations of the law.
8. Based on my expertise and available evidence, I have reached the following opinions:

A. Two-Sided Transactions Platforms

9. **Opinion 1.** Two-sided platforms serve two different groups who benefit from interacting in some way, and their core business is to facilitate those interactions. Platforms generally exhibit indirect network effects: the value of a platform to one group of users increases as the number of users in the other group increases. To ensure balanced participation, two-sided platforms must carefully choose the prices that they charge each group and must take account of feedback loops that can flow from price increases on either group. (§ III, pp. 10-12; Appendix D, pp. D-1-6)
10. **Opinion 2.** Two-sided *transaction* platforms facilitate simultaneous, observable transactions between members of the two groups or “sides.” Transaction platforms exhibit strong bilateral indirect network effects, which make them more complex than ordinary,

³ Expert Report of Professor Daniel L. McFadden, *In Re: Apple iPhone Antitrust Litigation*, No. 4:11-cv-06714-YGR, United States District Court Northern District of California, Oakland Division, June 1, 2021. (hereinafter “McFadden Report”).

⁴ Expert Class Certification Report of Professor Nicholas Economides, *Cameron et al. v. Apple Inc.*, No. 4:19-cv-03074-YGR, United States District Court Northern District of California, Oakland Division, June 1, 2021. (hereinafter “Economides Report”).

⁵ Expert Class Certification Report of Professor Einer Elhauge, *Cameron et al. v. Apple Inc.*, No. 4:19-cv-03074-YGR, United States District Court Northern District of California, Oakland Division, June 1, 2021. (hereinafter “Elhauge Report”).

one-sided businesses. Strong network effects create feedback loops that amplify demand reductions when prices are raised. (§ III, pp. 10-12; Appendix D, pp. D-6-11)

11. **Opinion 3.** Transaction platforms provide a single product—transactions—that is jointly consumed by both sides of the platform, not separate products to each side of the platform. A single transaction platform may face different competitive constraints for different types of transactions. If those competitive constraints differ substantially, it will be appropriate to consider the different transactions types to be in separate relevant markets. (§ IV.A.1, pp. 17-18; 21-31)
12. **Opinion 4.** The App Store is a two-sided transaction platform. The App Store facilitates transactions that simultaneously involve developers and users—downloads, app updates, and in-app purchases that unlock functionalities within the app. Because the App Store is a two-sided transaction platform, it experiences strong indirect network effects that connect consumers and app developers. (§ III, pp. 11-12; Appendix D, pp. D-38-58)
13. **Opinion 5.** Professors Elhauge and Economides accept that the App Store is a two-sided transaction platform but neglect the Store’s strong indirect network effects. Professor McFadden instead describes Apple as a retailer operating in wholesale and retail markets and thus completely ignores indirect network effects. (§ III, pp. 12-16)
14. **Opinion 6.** Both the developer class and the consumer class are improper. The developer class includes only [REDACTED] of developers who have used the App Store, and the consumer class includes only [REDACTED] of consumers who have used the App Store. The excluded participants participated only in zero-commission transactions, but these transactions are integral to the App Store, to its attractiveness to both sides, and to the choices that all developers and consumers make. (§ III, pp. 16-17)

B. Market Definition

15. **Opinion 7.** Plaintiffs’ experts cluster all (paid) iOS app transactions into a single relevant antitrust market, without taking adequate account of differences in competitive conditions among sub-groups of apps. Even though the App Store supplies a single product, transactions, when substitution possibilities for transactions for sub-groups of apps differ

substantially, correct economic analysis requires the definition of separate antitrust markets. Their treatment of fore- and aftermarkets is perfunctory. (§ IV.A.1, pp. 18-31)

16. **Opinion 8.** Professor Elhauge’s hypothetical monopolist test is an uninformative comparison of Apple’s average commission rates to inappropriate “yardstick” commission rates. Professor Elhauge claims that using either of Professor Economides’ yardsticks inherently accounts for indirect network effects, but neither he nor Professor Economides provides any evidence that the indirect network effects for Professor Economides’ two-sided transaction platform comparators resemble those of the App Store. (§ IV.A.2, pp. 34-40)

C. Market Power

17. **Opinion 9.** Plaintiffs’ experts’ assessments of the App Store’s market power rests on an estimate of its operating margin, but operating margins do not measure economic profitability. Moreover, the iOS ecosystem abounds with what economists call “joint costs” which cannot be allocated in an economically meaningful way among the multiple products that those costs support. (§ IV.B.1, pp. 44-48)
18. **Opinion 10.** Apple’s share of Plaintiffs’ incorrectly defined markets has no meaning. Moreover, online platforms with strong indirect network effects and low barriers to entry can experience rapid changes in market share, so a high share of even a well-defined market would not imply durable market power. (§ IV.B.2, pp. 49-51)

D. Establishing Antitrust Injury to Individual Class Members

19. **Opinion 11.** All three of Plaintiffs’ economic experts ignore that to evaluate harm in this matter, one must compare the effects of Apple’s monetization policy in the actual world to its monetization policy in the but-for world, evaluating Apple’s incentives to alter multiple elements of its monetization in the but-for world. The level of the App Store’s headline 30% commission cannot be analyzed in a vacuum, as if it were the only pricing element that Apple could change in a but-for world. (§ IV.C.1, pp. 58-59)

E. The App Store in the But-For World

20. **Opinion 12.** In the but-for world, contrary to the assertions of Plaintiffs’ experts, it is most likely that the App Store’s headline commission rate would not have been cut below 30%.

This is consistent with Apple’s fundamental competitive strategy and with the actual behavior of other online stores that have faced direct competition. (§ V.A, pp. 65-73)

21. **Opinion 13.** In the but-for world, Apple’s ability to use App Store commissions to charge developers for the use of its intellectual property would be reduced. It is highly likely, contrary to the assumptions of plaintiffs’ experts, that it would respond by changing other aspects of its multi-dimensional monetization strategy. Plausible changes would have different effects on differently situated developers, and would thus have different effects on consumers with different purchasing patterns. (§ V.B, pp. 73-82)

F. Plaintiffs’ Experts Cannot Assess Harm to Individual Class Members

22. **Opinion 14.** Even though Windows developers incur a range of distribution costs in the actual world, and Plaintiffs’ experts assert that in the but-for world iOS developers would have a variety of distribution options, Professors Elhauge, Economides, and McFadden assume that all iOS developers in the but-for world would face the same commission schedule. Professors Economides and McFadden use badly flawed benchmarks to estimate average but-for commission rates. (§ VI, pp. 87-88; § VI.B.1, pp. 90-94; § VI.C, pp. 101-106)
23. **Opinion 15.** Professors Economides and McFadden make a number of patently unrealistic assumptions that make their analyses unreliable: both assume all developers sell only one app and cannot enter, exit, or change their business model in the but-for world, demand for each app is unaffected by the prices of competitive apps, and in-app advertising and indirect network effects can be neglected. They entirely neglect free apps, which are important to consumers and developers in the actual world and would be affected by changes in the but-for world. (§ VI.B.2, pp. 94-101; § VI.C, pp. 106-113)
24. **Opinion 16.** Plaintiffs’ experts all neglect competition among developers but reach diametrically opposite conclusions regarding the incidence of antitrust injury. Professor Economides asserts that app prices and quantities would be unchanged in the but-for world, which implies no consumer injury or anticompetitive effects. Professor Elhauge agrees that app prices would not change much, but he argues that there would be more apps in the but-for world. No expert has modeled entry, which would reduce the profits of incumbent app developers. (§ IV.C.2, p. 60; § VI, pp. 83-87; § VI.D, pp. 113-121)

25. **Opinion 17.** In contrast to Professors Economides and Elhauge, Professor McFadden finds that prices of existing apps would be lower in the but-for world, even though he does not consider entry. He estimates an econometric model that allows for both groups to be harmed, and he concludes that for the app categories he examines, consumer harm is roughly four times as large as developer harm, though he admits that a large number of consumers in the putative class may suffer no harm at all. (§ VI.C, pp. 112-113)

III. Plaintiffs’ Experts Either Ignore the Fact that the App Store is a Two-Sided Transaction Platform or Generally Ignore the Implications of That Fact

26. In its *Ohio v. American Express* (“*Amex*”) decision, the Supreme Court noted that, according to economists, a “two-sided platform offers different products or services to two different groups who both depend on the platform to intermediate between them.”⁶ It cited a more complete description, based on my work, that two-sided platforms “serve distinct groups of customers who need each other in some way, and the core business of the two-sided platform is to provide a common (real or virtual) meeting place and to facilitate interactions between members of the two distinct customer groups.”⁷
27. Economists recognize a particular type of multi-sided platforms (often referred to as “transaction platforms”) that primarily facilitate observable transactions, often sales transactions, between the two groups of platform users. Transaction platforms exhibit particularly pronounced indirect network effects: the value of participation on a transaction platform increases not only with the number of users on the other side of the platform (sometimes referred to as membership externality), but also with the usage of the platform on the other side (sometimes referred to as usage externality). The *Amex* Court recognized this distinction, noting that: “Because they cannot make a sale unless both sides of the platform simultaneously agree to use their services, two-sided transaction platforms exhibit more pronounced indirect network effects and interconnected pricing and demand.”⁸

⁶ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 2.

⁷ Evans, David S. and Richard Schmalensee, “Markets with Two-Sided Platforms,” *Issues in Competition Law and Policy* (ABA Section of Antitrust Law), 1, 2008, pp. 667-693, at p. 667.

⁸ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 13.

28. In **Appendix D**, I discuss in detail the fundamental features of two-sided transaction platforms and how they can be identified and differentiated from one-sided business models. Specifically, I identify three fundamental features of two-sided transaction platforms:
- i. Like other platforms, two-sided transaction platforms need to adopt pricing strategies, service provision strategies, and rules of behavior to attract two distinct groups of users and to facilitate productive interactions between them.
 - ii. Two-sided transaction platforms derive substantial value from strong bilateral indirect network effects.
 - iii. Two-sided transaction platforms have as their main purpose the facilitation of observable transactions that simultaneously connect members of the two groups of users. These are often, but not always, sales transactions.
29. In **Appendix D** I also discuss in detail that the iOS App Store displays all three of these fundamental features and is thus clearly a two-sided transaction platform. This fact was accepted by both sides in the *Epic* litigation.⁹ First, to be viable, the App Store needs to attract both consumers and developers. Second, there are clear bilateral indirect network effects here: consumers want access to good apps (and the more good apps they have access to, the better), and developers want access to as many potential customers as possible. Third, the App Store generates value for both groups of customers when there is a transaction between a consumer and a developer—a download or an in-app purchase of digital content from a developer. In contrast, a predominantly brick-and-mortar retailer like GameStop does not exhibit these fundamental features of a two-sided transaction

⁹ Written Direct Testimony of Richard Schmalensee, Ph.D., *Epic Games, Inc., v. Apple, Inc.*, No. 4:20-CV-05640-YGR-TSH, United States District Court for the Northern District of California, Oakland Division, April 23, 2021 (“Schmalensee Written Direct Testimony”), at ¶ 44 (“The App Store displays all three of these fundamental features and is thus clearly a two-sided transaction platform.”); Written Direct Testimony of Dr. David S. Evans, *Epic Games, Inc. v. Apple, Inc.*, No. 4:29-CV-05640-YGR-TSH, United States District Court for the Northern District of California, Oakland Division, April 20, 2021 (“Evans Written Direct Testimony”), at ¶ 92 (“App distribution, in the absence of restraints, is typically provided by a mixture of app stores (which are two-sided transaction platforms), single-sided retailers, direct-to-user downloads, and pre-installation.”).

platform.¹⁰ Like a bookstore, GameStop buys its products (games) directly from manufacturers and game publishers and sells them to consumers with a markup. Hence, there is no direct, observable transaction between consumers on one side and manufacturers and game publishers on the other side, a key defining feature of two-sided transaction platforms.

30. Because of indirect network effects, the multi-sided platform business model is much more complex than the business model of a brick-and-mortar retailer or other single-sided businesses. Platforms must select pricing strategies, service provision, and rules of behavior so as to ensure balanced participation of the customer groups they serve. If a platform is required to alter one element of its overall strategy—pricing to one side or rules of behavior affecting another side, for instance—it may find it desirable or even necessary to respond by altering other elements of its strategy, with diverse (perhaps unpredictable) effects on groups on both sides of its platform. Hence, even minor changes to a platform’s pricing strategy always require careful considerations from various viewpoints.
31. Therefore the use of a two-sided framework is necessary for a proper evaluation of the App Store’s conduct. Consumer Plaintiffs adopt a framework that explicitly rejects the two-sided nature of the App Store, therefore drawing conclusions that are fundamentally unreliable. Developer Plaintiffs’ experts, despite accepting in principle that the App Store is a two-sided transaction platform, essentially ignore the implications of that fact, which also leads to unreliable analysis.
32. Developer and Consumer Plaintiffs’ experts disagree on the fundamental question of whether the App Store is a two-sided transaction platform. While Professors Elhauge and Economides accept the fact that the App Store is a two-sided transaction platform,¹¹ Professor McFadden’s report characterizes Apple as a retailer that sells iOS apps and in-app

¹⁰ Although GameStop has introduced a digital store, its online channels account for only 20 percent of its revenue. See Brustein, Joshua, “GameStop Looks to a Digital Future,” *Bloomberg*, November 20, 2020, available at <https://www.bloomberg.com/news/newsletters/2020-11-20/gamestop-looks-to-a-digital-future> (“Last quarter brought an 800% spike in digital sales—bringing online channels to about 20% of GameStop’s total revenue.”).

¹¹ Developer Plaintiffs Motion, at p. 10; Elhauge Report, at ¶ 37; Economides Report, at ¶ 42.

content, rejecting the two-sided platform framework.¹² In his deposition he expressed the view that the App Store also transacted with developers in a wholesale market that he did not mention in his report.¹³

33. Professor Elhauge argues that the App Store is a two-sided transaction platform because it meets three conditions: “(1) the platform sells two different products to two distinct groups of customers that need the platform to intermediate the interaction, (2) the platform exhibits ‘indirect network effects’ [...], and (3) the platform involves observable and simultaneous transactions between both sides.”¹⁴ I largely agree with this characterization, with the exception that the platform sells a single product—transactions—rather than two separate products for each side of the platform, and it may sell that product in markets with different competitive conditions. The Supreme Court also made a similar distinction in *Amex* when it explained that credit-card companies supply only one product—transactions—simultaneously to cardholders and merchants, even though they provide separate services to both groups, which are inputs to this single product, and directly charge only merchants.¹⁵
34. Professor Economides also agrees that the App Store is a two-sided platform and claims without evidentiary or theoretical support that his analysis accounts for indirect network effects between developers and consumers.¹⁶ A careful analysis of the but-for world he proposes reveals that Professor Economides makes the arbitrary and unrealistic choice to

¹² McFadden Report, at ¶ 42.

¹³ Deposition of Daniel McFadden, Vol.1, August 3, 2021 (“McFadden Deposition”), at 31:10-21 (“Q. Have you defined a relevant wholesale market in this case? A. I have not specifically defined a -- a wholesale market, but using the terminology that I have used and -- and -- which is that the Apple Store is an intermediary retailer and distributor. The -- the relationship between the Apple Store and the developers is -- is a wholesale market relationship, and the relationship between the App Store and consumers is a retail market relationship, and those two markets are bound -- closely bound together.”).

¹⁴ Elhauge Report, at ¶ 40.

¹⁵ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at pp. 2, 13, and 14 (“The network provides separate but interrelated services to both cardholders and merchants. [...] It cannot sell transaction services to either cardholders or merchants individually. [...] [C]redit-card companies are best understood as supplying only one product—transactions—which is jointly consumed by a cardholder and a merchant. [...] Merchant services and cardholder services are both inputs to this single product.”).

¹⁶ Economides Report, at ¶¶ 42, 64-67, and footnote 96. Indirect network effects operate at the platform level, not at the level of individual developers, as Professor Economides implicitly asserts by focusing on the demand curve facing a single developer.

ignore indirect network effects and to largely ignore any analysis of consumer welfare.¹⁷ He adds that digital marketplaces “do not generally take possession of goods or set any prices, and so do not have to operate warehouses or other major physical facilities.”¹⁸

35. Consumer Plaintiffs and Professor McFadden stand in stark contrast with the opinions presented by Developer Plaintiffs’ experts Professors Elhauge and Economides, as well as Epic’s expert Dr. Evans, who testified that the App Store is a two-sided transaction platform.¹⁹ Consumer Plaintiffs allege that “Apple unlawfully monopolizes the retail market for the sale of apps, including [in-app purchases].”²⁰ Likewise, Professor McFadden describes Apple as a retailer operating in a vertical relationship between developers and consumers. He claims that developers are “suppliers that ‘manufacture’ apps and in-app content and supply them through Apple,” and Apple “is a retailer that sells iOS apps and in-app content” to consumers who have iOS mobile devices.²¹ Rather than treating developers as another distinct group of customers, as is appropriate when analyzing a two-sided transaction platform, Professor McFadden considers developers to be suppliers for whom the App Store commission is a component of operating costs — similar to a sales tax, with the burden shared by developers and consumers.²² Furthermore, he claims that “app developers set ‘wholesale’ prices that maximize their profits, accounting for [...] the effect of the ‘retail’ prices on consumer demand for their product.”²³ Thus, Professor McFadden’s report ignores indirect network effects, as he rejects the two-sided framework completely.²⁴ It is worthwhile to note that, when asked if he agreed that the App Store

¹⁷ I explain the shortcomings of Professor Economides’s approach in greater detail in **Section VI.B**.

¹⁸ Economides Report, at ¶ 42.

¹⁹ Trial Testimony of David Evans, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 11, 2021, at 1347:7-9 (“Q. Okay. Now, the App Store is a two-sided transaction platform; isn’t that right? A. Yes, it is.”).

²⁰ Consumer Plaintiffs Motion, at p. 1.

²¹ McFadden Report, at ¶ 42.

²² McFadden Report, at ¶¶ 132, 149.

²³ McFadden Report, at ¶ 14.

²⁴ McFadden Deposition, at 63:24-64:16 (“Q. [...] Would you describe your market for selling consumers iOS apps and in-app content as single-sided? [...] THE DEPONENT: Well, I think in terms of dealing with consumers, the behavior of the App Store is very much like a traditional retailer. So that’s a -- that’s a transaction between a -- a retailer and a -- and a consumer. Now, the products that they are selling are

should be analyzed as a retailer, Professor Elhauge testified that he disagreed with this framing.²⁵

36. In fact, in his deposition, Professor McFadden mischaracterized what constitutes a two-sided transaction platform claiming that it is an “intermediary that is arranging transactions between upstream economic agents and downstream economic agents.”²⁶ When asked if he agreed with the Supreme Court’s definition of a platform—namely that “a two-sided platform offers different products or services to two different groups who both depend on the platform to intermediate between them”—Professor McFadden said he has not heard that definition and he was unsure that the statement would characterize his understanding of a platform.²⁷ Even though in his deposition Professor McFadden discussed similarities of

produced to order rather than to inventory. So it’s not that the Apple Store is inventorying licenses, which it then distributes as -- as they’re demanded. But rather, that it simply goes back to the developer -- effectively goes back to the developer and says here -- here’s an order, fill it. But that’s not inconsistent with the traditional notion of a retailer.”).

²⁵ Deposition of Einer Elhauge, Vol.1, July 30, 2021 (“Elhauge Deposition”), at 73:18-23 (“Q. [...] Do you agree with the view that Apple is a retailer that sells iOS apps and in-app content and app developers are suppliers that manufacture apps and in-app content and supply them through Apple? A. No.”); Deposition of Nicholas Economides, Vol.1, August 4, 2021 (“Economides Deposition”), at 73:20-74:23 (“Q. Are you aware that Professor McFadden has the opinion that Apple is a retailer of apps, as an economic matter? [...] A. Traditionally, a retailer is somebody who gets a product, puts it on his shelf, and then resells it. That’s what traditionally retailing means. Now, Apple doesn’t seem to be doing that, you know. It doesn’t take possession of the product. It acts as an intermediary through the App Store and brings together the -- the buyers and the-- and the sellers. So that’s why I think the discussion on retailing and so on is a bit off the subject.”).

²⁶ McFadden Deposition, at 46:5-21 (“Q. And what is your understanding, as an economist, of what a two-sided transaction platform is? A. That there is a -- a platform or intermediary that is arranging transactions between upstream economic agents and downstream economic agents, with services that include providing information, matching, ensuring fulfillment of the transaction and so forth. And that depending on how you define the term “platform,” those transactions might be fully simultaneous on -- on both sides of the platform or they might be -- they might -- may not be simultaneous. They might -- there might be some, say, production to inventory in between that you could still have an intermediary acting as a platform.”).

²⁷ McFadden Deposition, at 45:16-23 (“Q. [...] Professor, as an economist, do you agree that a two-sided platform offers different products or services to two different groups who both depend on the platform to intermediate between them? A. I -- I have not heard that definition before, and I’m not sure that would characterize my understanding of a platform.”).

the App Store with credit cards, he confirmed his view that the retail framework is the correct approach to analyze the App Store’s conduct in this matter.^{28, 29}

37. Furthermore, both defined classes are improper in light of the two-sided nature of the App Store. Developer and Consumer Plaintiffs’ proposed classes include only participants in transactions that took place with a non-zero commission, which is a subset of all transactions that took place in the App Store. These gerrymandered class definitions include only [REDACTED] of developers that had a transaction on the App Store and only [REDACTED] of consumer accounts that had a transaction on the Store.³⁰ These definitions are thus inconsistent with the fact that all transactions, regardless of whether a commission is involved or not, are subject to the App Store’s evolving monetization model — of which the commission is just one element.
38. Uber and Lyft have paid \$99 annually to join the Apple Developer Program, for instance, even though they have not paid commissions. If that annual fee were higher in the but-for world, as it might well be, they would be worse off. Such a higher annual fee would likely reduce the supply of free apps, making consumers who only downloaded free apps in the actual world worse off. One cannot ignore a large fraction of App Store participants just because the App Store has implemented a monetization policy with one component that does not apply to the transactions in which they have chosen to engage.

²⁸ McFadden Deposition, at 56:19-57:5 (“Q. Okay. And is it your opinion that the market in this case is different from the type of two-sided transaction platforms that exist in the credit card business? A. I would say that -- that from an economist’s point of view, functionally, they -- the app -- iOS app market has similarities to the -- to credit cards in that primary function of the -- of this intermediary is to facilitate transactions and -- and fulfill -- fulfill transactions. So those are -- those are common --common features in those two markets.”).

²⁹ McFadden Deposition, at 63:24-64:16 (“Q. [...] Would you describe your market for selling consumers iOS apps and in-app content as single-sided? [...] THE DEPONENT: Well, I think in terms of dealing with consumers, the behavior of the App Store is very much like a traditional retailer. So that’s a -- that’s a transaction between a -- a retailer and a -- and a consumer. Now, the products that they are selling are produced to order rather than to inventory. So it’s not that the Apple Store is inventorying licenses, which it then distributes as -- as they’re demanded. But rather, that it simply goes back to the developer -- effectively goes back to the developer and says here -- here’s an order, fill it. But that’s not inconsistent with the traditional notion of a retailer.”).

³⁰ Expert Report and Declaration of Lorin Hitt, *Cameron et al. v. Apple Inc. & In Re: Apple iPhone Antitrust Litigation*, No. 4:19-cv-03074-YGR, No. 4:11-cv-06714-YGR, United States District Court for the Northern District of California, Oakland Division, August 10, 2021 (“Hitt Class Report”), at ¶¶ 56, 70.

39. In a two-sided market, the participation of all developers and consumers, including those participating only in zero-commission transactions during the class periods, affects the attractiveness of the platform to both sides and therefore the choices that developers and consumers make. Choices on one side in turn affect participation on the other side due to the presence of indirect network effects. The lack of a commission is therefore not a valid basis for excluding those who participate solely in zero-commission transactions from the Developer and Consumer Plaintiffs’ classes. The excluded developers and consumers might be worse off – or better off – in likely but-for worlds.
40. Concluding that the App Store is a two-sided transaction platform is just the starting point for analyzing antitrust questions of product market definition, market power, and competitive effects. The key is the careful application of these principles while bearing complexities of platform businesses in mind. In the sections that follow, I describe in detail the implications of the fact that the App Store is a two-sided transaction platform, the failure of Plaintiffs’ experts’ analyses to account for these implications, and the resulting unreliability of their conclusions. Neither analysis does justice to the demonstrable novelty and complexity of the markets involved.

IV. Implications of the Fact that the App Store Is a Two-Sided Transaction Platform for Market Definition, Assessment of Market Power, and Antitrust Impact

A. Implications for Defining Product Market(s)

1. Developer and Consumer Plaintiffs’ Experts Ignore that Different Types of Transactions Face Different Competitive Conditions

41. Market definition is a tool to identify the lines of commerce and the geographic locations that are potentially affected by the alleged anticompetitive conduct and the parties that compete in those markets. It is generally a first step in assessing the extent to which firms have market power and whether the alleged conduct resulted in harm to buyers and/or sellers in that market.³¹

³¹ “Horizontal Merger Guidelines,” *U.S. Department of Justice and the Federal Trade Commission*, August 19, 2010, at pp. 7–8.

42. Antitrust markets are defined based on the concept of substitutability and are defined along product and geographic dimensions. The product dimension identifies the goods or services that are deemed sufficiently substitutable to belong in the same antitrust market.³²
43. Although the principles underpinning market definition are the same in the context of single-sided businesses market and two-sided platforms, the fact that two-sided transaction platforms compete for two distinct customer groups that must simultaneously reach agreement in order to produce the platform’s output—transactions—has important ramifications for analyzing market definition.
44. First, as the Supreme Court noted in the *Amex* case, two-sided transaction platforms are best understood as “supply[ing] only one product—transactions.”³³ Because the App Store exists to facilitate transactions between developers and end users using the iOS platform, the App Store supplies one basic product—transactions—which is jointly consumed by developers and end users —rather than separate products for each side of the platform. In Sherman Act cases pertaining to platforms, market definition starts with the platform at the center of the case and the identification of the relevant products and the geographic scope of its business. Because the basic type of product at issue here is transactions, identifying the boundaries of the relevant antitrust product market should therefore encompass both sides of the platform. Defining product markets for only one side of the platform—i.e., defining a market for sales to consumers that excludes developers—would lead to misleading conclusions, often markets that are too narrow.³⁴
45. Professors Elhauge and McFadden attempt to define a single relevant antitrust product market covering transactions involving all iOS apps and in-app content, possibly excluding

³² As I discuss further below, the geographic dimension, in cases involving alleged misconduct by sellers, identifies the geographic boundaries of buyers’ willingness and ability to substitute across the goods or services that are available in different geographic locations. See “Horizontal Merger Guidelines,” *U.S. Department of Justice and the Federal Trade Commission*, August 19, 2010, at pp. 8, 13.

³³ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 14 (“For all these reasons, ‘[i]n two-sided transaction markets, only one market should be defined.’”).

³⁴ See Filistrucchi, Lapo, “A SSNIP Test for Two-Sided Markets: The Case of Media,” *NET Institute Working Paper*, October 2008, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1287442, at p. 22.

zero-commission apps.³⁵ Professor McFadden’s relevant market is an aftermarket to a primary market in which “consumers choose OS installed mobile devices such as iOS mobile devices or Android mobile devices.”³⁶ Professor Elhauge also analyzes iOS app and digital IAP distribution services as an aftermarket to the smartphone and tablet markets in the alternative, to show that framing it this way does not reduce Apple’s market power in his opinion.³⁷ Neither expert’s market definition analysis succeeds in properly accounting for the main purpose of the App Store as a two-sided transaction platform. Professor McFadden’s relevant market for “selling consumers iOS apps and in-app content” fails to acknowledge that the App Store’s output is transactions, provided simultaneously to developers and consumers. Focusing only on the services provided to consumers is precisely the economic error committed by plaintiffs in *Amex* when they focused only on the merchant side of payments card platforms.^{38, 39}

³⁵ McFadden Report, at ¶ 42 (“Common economic evidence supports the conclusion that there exists a relevant antitrust market for selling consumers iOS apps and in-app content, which are relevant products in this market.”); Elhauge Report, at ¶ 28 (“I conclude that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services”). On their possible exclusion of zero-transactions involving zero-commission apps, *see* ¶ 52.

³⁶ McFadden Report, at ¶ 44.

³⁷ Elhauge Report, at ¶ 180.

³⁸ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 15 (“As an initial matter, the plaintiffs’ argument about merchant fees wrongly focuses on only one side of the two-sided credit-card market. As explained, the credit-card market must be defined to include both merchants and cardholders. Focusing on merchant fees alone misses the mark because the product that credit-card companies sell is transactions, not services to merchants, and the competitive effects of a restraint on transactions cannot be judged by looking at merchants alone.”); Brief for *Amici Curiae* Prof. David S. Evans and Prof. Richard Schmalensee in Support of Respondents, *State of Ohio et al. v. American Express Company et al.*, No. 16-1454, Supreme Court of the United States, January 23, 2018, at footnote 11 (“We agree with the Second Circuit’s conclusion in *American Express* that the Plaintiffs failed to establish—taking both sides into consideration—that the challenged provisions resulted in anticompetitive effects because there was no evidence that the provisions resulted in an overall increase in price and, most importantly, an overall decrease in the output of transaction services.”).

³⁹ Klein, Benjamin, Andres V. Lerner, Kevin M. Murphy, and Lacey L. Plache, “Competition in Two-Sided Markets: The Antitrust Economics of Payment Card Interchange Fees,” *Antitrust Law Journal*, 73(3), 2006, pp. 571-626, at p. 580 (“[A] payment card system supplies only one product, payment card transactions that are jointly consumed by a cardholder, who uses the payment card to make a transaction, and a merchant, who accepts the payment card as a method of payment”); Filistrucchi, Lapo, Damien Geradin, Eric van Damme, and Pauline Affeldt, “Market Definition in Two-Sided Markets: Theory and Practice,” *Journal of Competition Law & Economics*, 10(2), 2013, pp. 293-339, at p. 298 (“Two-sided transaction markets, such as payment cards, are instead characterized by the presence and observability of a transaction between the two groups of platform users.”).

46. Moreover, Professor Elhauge’s and Professor McFadden’s division of the Apple ecosystem into foremarket and aftermarket is perfunctory and divorced from the realities of two-sided transaction platforms such as the App Store.⁴⁰ They assert the existence of a foremarket for OS-installed mobile devices without performing a rigorous market definition analysis.⁴¹ In fact, Apple faces numerous large competitors for the sale of such devices, competitors that get their operating systems essentially for free.⁴² In the U.S. it faces effective competition from Samsung, LG, Lenovo, and a number of other vendors.⁴³ Apple’s ability to compete in the smartphone/operating system business depends on its ability to offer consumers high quality handsets at affordable prices as well as a large selection of high-quality apps—and thus on making the App Store attractive to developers as well as consumers.
47. Even if competition for bundles consisting of devices and operating systems were not intense, as Professor Elhauge implies,⁴⁴ it would have no implications for the issues in this case. This case is about transactions between app developers and consumers, not about competition among operating systems or devices that use them. Professor Elhauge acknowledges that developers do not participate in the supposed foremarket, but he claims that this results in developers being unable to defeat supracompetitive prices in his aftermarket.⁴⁵ This argument is non-sensical. The correct way to analyze iOS and the App Store is as a single, integrated, two-sided platform, in which the App Store is Apple’s mechanism for facilitating transactions between developers and end-users. There is only a

⁴⁰ Professor Elhauge also analyzes iOS app distribution as an aftermarket in the alternative, for which he claims that competition in the device market could not prevent Apple’s monopoly power in the aftermarket for iOS app and IAP distribution services. *See* Elhauge Report, at Section II.E.

⁴¹ McFadden Report, at ¶ 44 (“In the primary market, consumers choose OS installed mobile devices such as iOS mobile devices or Android mobile devices.”) and footnote 58 (“I do not perform a rigorous market definition analysis on the primary market because Apple’s alleged anticompetitive conduct in this case relates only to the aftermarket.”); Elhauge Report, at ¶ 219 (“Competition has not been robust in the foremarkets for smartphones and tablets because Apple has had strong market power in those device markets.”).

⁴² “Android is for everyone,” *Android*, available at <https://www.android.com/everyone/>, accessed on March 14, 2021 (“The Android source code is free for anyone to download, customize, and distribute. This lets manufacturers build mobile devices at lower costs, giving people around the globe access to mobile technology that was previously out of reach.”).

⁴³ “US Smartphone Market Share: By Quarter,” *Counterpoint Research*, May 21, 2021, available at <https://www.counterpointresearch.com/us-market-smartphone-share/>.

⁴⁴ Elhauge Report, at ¶ 219 (“Competition has not been robust in the foremarkets for smartphones and tablets because Apple has had strong market power in those device markets.”).

⁴⁵ Elhauge Report, at ¶ 217.

single two-sided transaction platform that facilitates interactions between developers and end users in the iOS ecosystem. And, since the allegations of this case concern this transaction platform, the product market must center on the transactions facilitated by this platform, and any assessment of the boundaries of the market must include an analysis that seeks to identify transactions facilitated by other transaction platforms that are sufficiently substitutable from the perspective of developers and end users.

48. Second, it is important to recognize that a single transaction platform may face different competitive constraints for different types of transactions. If those competitive constraints differ substantially, it will be appropriate to consider the different transactions types to be in separate relevant markets. This is not a novel point, nor is it specific to platforms. For instance, the Ford Motor Company produces one basic type of product: motor vehicles. It may face a rather different set of competitors for its trucks than for its sedans, however. If this is the case, and if an antitrust case centers on Ford trucks, a proper analysis may focus on the market for trucks, while taking into account supply-side and demand-side constraints from outside that market. In particular, firms that do not produce trucks may not belong in the relevant market, though the ease with which they could enter that market should be considered. To the extent an antitrust case concerns all the products sold by the Ford Motor Company, encompassing trucks and sedans, it may nonetheless be appropriate to define multiple relevant antitrust markets if different products face different competitive constraints.
49. In order to properly define the relevant markets in this matter, one must determine the competitive constraints faced by the App Store for different types of transactions, and the extent to which other platforms are sufficiently substitutable from the perspective of the developers or consumers who participate in those transactions to be included in the market. For a transaction platform, the relevant question is reasonable interchangeability / substitutability of transactions involving groups served by the platform at the center. As a matter of economics, two-sided platforms face competition from other similarly situated two-sided platforms that facilitate transactions between the two sets of users. As **Exhibit 1** indicates, a large number of firms have chosen, as Apple did, to develop their own app

stores, for similar reasons—to create a marketplace where developers and users can meet and transact.

50. The set of transaction platforms that are reasonably substitutable for the App Store may differ by the type of transaction. While for certain apps such as ridesharing, users and developers may indeed not have sufficiently substitutable transactions platforms to smartphones and tablets, for other apps, in particular games, developers and end users in fact have a large set of reasonably substitutable transactions platforms, including consoles, personal computers, streaming services, smart TVs, virtual reality gear, etc. A user wishing to purchase virtual currency in a game such as *Fortnite* may make the purchase in the App Store, on a game console, or even in a web browser, but they cannot use an e-book reader or store to obtain that currency. On the other hand, a user wishing to browse for cooking recipes may purchase a recipe app from the App Store, a recipe e-book on their e-book reader, or even a physical recipe book, but it is unlikely that they would turn to a game console to access recipes. In fact, named plaintiff Cameron, the developer of the app Lil’ Baby Names, acknowledges in the app description on the Google Play Store that the app competes with books listing baby names.⁴⁶ This is certainly not the case for an app such as *Fortnite*.⁴⁷ Similarly, a user wishing to view a movie may be able to stream it on an iOS app or on their smart television or console, purchase or rent a DVD, or watch it on demand through their cable provider.
51. The competitive conditions for digital game transactions, for example, are different from those of non-game transactions because of the presence of significant transaction platforms that focus almost exclusively on digital game transactions, *e.g.*, the PlayStation Store and

⁴⁶ The Google Play Store description of the Lil’ Baby Names app states “Instead of buying a book, try our simple search function that allows you to discover names in a way that other apps can’t.” See “Lil’ Baby Names,” *Google Play Store*, available at https://play.google.com/store/apps/details?id=com.jim.nameit&hl=en_US&gl=US, accessed on July 29, 2021.

⁴⁷ Because Fortnite is a video game, transactions that are reasonable substitutes for iOS Fortnite transactions are those involving other games on the iOS platform and on other gaming platforms. See, *e.g.*, Written Direct Testimony of Francine Lafontaine, Ph.D., *Epic Games, Inc. v. Apple, Inc.*, No. 4:20-CV-05640-YGR-TSH, United States District Court for the Northern District of California, Oakland Division, April 23, 2021 (“Lafontaine Written Direct Testimony”), at ¶ 3 (“Since games face different competitive alternatives from other types of apps, it follows that grouping all types of apps together, as Epic proposes to do, would be inappropriate as a cluster market.”). See also “What is Fortnite? Beginner’s Guide,” *Epic Games*, September 2, 2020, available at <https://www.epicgames.com/fortnite/en-US/news/what-is-fortnite-beginners-guide>.

Nintendo eShop. The competitive conditions for various sorts of non-game transactions also differ.

52. Despite this heterogeneity across transactions, app categories and genres, in their reports Professors Elhauge and McFadden each define a single relevant antitrust product market involving all iOS apps and in-app content.⁴⁸ However, in his deposition Professor Elhauge has asserted, without providing theoretical or evidentiary support, that zero-commission transactions are in a different market than non-zero commission transactions,⁴⁹ and Professor McFadden has asserted, also without support, that free apps are not reasonably interchangeable with paid apps.⁵⁰ These views are inconsistent with consumers’ preferences and market realities. From a consumers’ perspective, free and paid transactions of the same type of app are substitutable. The surveys conducted by Professor Simonson suggest that 98 percent of iOS consumers use free apps and iOS consumers view free apps as about three times more valuable than paid apps.⁵¹ About 43 percent of these iOS consumers also use paid apps.⁵² For example, consumers have both free and paid calculator

⁴⁸ McFadden Report, at ¶ 42 (“Common economic evidence supports the conclusion that there exists a relevant antitrust market for selling consumers iOS apps and in-app content, which are relevant products in this market.”); Elhauge Report, at ¶ 28 (“I conclude that the relevant product market in this case is the market for iOS app and digital in-app-purchase (IAP) distribution services”).

⁴⁹ Elhauge Deposition, at 72:7-10 (“Q. So -- so now that you’ve thought about it, your conclusion is that zero-priced transactions are not in your relevant market? A. I think so, yes.”) and 177:25-179:15 (“Q. There are over a quarter million U.S. developers excluded from the class? [...] THE DEPONENT: Well, they’re -- they’re not excluded from the class. They’re -- they’re not -- they never paid a commission, so they’re not in the class. Q. (By Mr. Swanson) Um-hmm. Out of that quarter million, didn’t most use the App Store for free apps? [...] THE DEPONENT: I -- I assume so. Otherwise, they would have paid a commission [...] I think they’re going to pay zero commission either way in the but-for world. And as I said before, I -- I think they’re in a -- a -- a separate market [...] there’d be no reason to think that the developers who find a price of zero to be optimal for their apps, no reason to think why they would not behave any differently in the but-for world.”).

⁵⁰ McFadden Deposition, at 67:13-68:2 (“[Q.] Just so I’m clear on your answer, is your answer, yes, free apps are a product in your relevant market? [...] THE DEPONENT: No. My -- my answer is that they -- they are in the data. They are excluded from the definition of -- of -- of the class, and they’re excluded from the calculations of harm and implied damages. Q. [...] Are free apps reasonably interchangeable with apps that are paid? A. Fairly clearly not -- not completely, because otherwise paid apps would have no -- no existence.”).

⁵¹ Expert Report and Declaration of Dr. Itamar Simonson, *Cameron et al. v. Apple Inc. & In Re: Apple iPhone Antitrust Litigation*, No. 4:19-cv-03074-YGR, No. 4:11-cv-06714-YGR, United States District Court for the Northern District of California, Oakland Division, August 10, 2021 (“Simonson Report”), at Exhibit 56 and Exhibit 59 and ¶124.

⁵² Simonson Report, at Exhibit 58.

apps available on the App Store, with multiple websites discussing the pros and cons of top calculator apps.⁵³ Professors Elhauge and McFadden would nonetheless claim that non-zero commission transactions for calculator apps are in the relevant market, but zero commission transactions for calculator apps are not. Moreover, some apps such as Spotify have both a paid and free version, and the free version offers many of the same features as the paid version.⁵⁴ Professor Elhauge and Professor McFadden would nonetheless claim that Spotify transactions with zero commission are not substitutable for Spotify transactions with non-zero commissions, and should somehow be in separate relevant antitrust markets. This is just plain wrong.

53. Although neither expert characterizes their market for all iOS apps as such, the single relevant market defined by each expert can only be characterized as a cluster market. When multiple products that are bought and sold independently face similar competitive conditions, such as common competitive suppliers and comparable degrees of ease of entry, these products may be combined to form a cluster market for analytical convenience.⁵⁵ Despite this convenience, scholars have urged caution in using cluster markets for market definition, as cluster markets could understate a competitor’s ability to constrain market power.⁵⁶

⁵³ Dirks, Brent, “The Top 10 Calculator Apps for iPhone, iPad, and Apple Watch,” *MakeUseOf*, July 13, 2021, available at <https://www.makeuseof.com/tag/top-calculator-apps-iphone-ipad-apple-watch/>; Mehak, “Best Calculator Apps for iPhone and iPad in 2021,” *iGeeksBlog*, May 7, 2021, available at <https://www.igeeksblog.com/best-calculator-apps-for-iphone-ipad/>; Torrevillas, Cherry Mae, “The best calculator apps for the iPhone,” *appPicker*, June 2, 2021, available at <https://www.apppicker.com/applists/23749/the-best-calculator-apps-for-the-iphone>.

⁵⁴ Archer, James and Henry T. Casey, “Spotify Free vs. Premium: Should you pay to play,” *Tom’s Guide*, May 28, 2021 (“For the most part, both free and paying users have the same access to Spotify’s library of ‘over 70 million’ songs and podcast titles [...] You can listen to Spotify pretty much everywhere [...] In this regard, it doesn’t matter if you pay for Premium, as Free users connect to all of the same devices [...] social features are largely identical regardless of whether or not you pay for Premium [...] discovery and curation features work identically regardless of subscription type.”).

⁵⁵ See Baker, Jonathan, “Market Definition: An Analytical Overview,” *Antitrust Law Journal*, 74(1), 2007, pp. 129-173, at p. 158 (“It can be defended as a matter of analytical convenience: there is no need to define separate markets...”).

⁵⁶ See Baker, Jonathan, “The Antitrust Analysis of Hospital Mergers and the Transformation of the Hospital Industry,” *Law and Contemporary Problems*, 51(2), 1988, pp. 93-164, at p. 126 (“In hospital industry terms, cluster markets may lead courts to underestimate the significance of outpatient clinics in restraining some forms of hospital collusion, and so to interdict mergers generating increased concertation among hospitals when the danger of collusion is limited.”). “Market Definition,” *OECD*, 2012, available at

54. Despite defining a single relevant market in his report, Professor McFadden conceded in his deposition that “it may be that [...] game markets are a [...] distinct market for some purposes.”⁵⁷ Professor McFadden also recognized that “certainly different app genres are accessed for different reasons by consumers and are treated in the App Store and by developers as being somewhat separate kinds of beasts.”⁵⁸ He then noted that he expects substitution among certain apps included in his market “to be relatively low,” a framing that is consistent with the cluster market framework.⁵⁹
55. Professor Elhauge argues that in the case of a two-sided transaction market, a transaction is a transaction, regardless of the underlying product bought and sold.⁶⁰ Professor Elhauge argues that “[c]luster market principles do not apply to the iOS app distribution market because all the products in this market [...] are all direct substitutes of each other.”⁶¹ Professor Elhauge points to *Amex*, noting that Amex “processes a payment, the product Amex sells is always the same (payment processing) even though the physical product that the consumer obtains as a result of the transaction varies.”⁶² What Professor Elhauge fails to recognize is that, even if the type of output of the platform (i.e., transactions) is the same no matter the merchant and consumer, the competitive conditions for certain credit card transaction categories may in fact be sufficiently distinct to warrant defining separate product markets.
56. For example, in the travel and entertainment segment, hotel chains have in the past offered their own credit cards, independent of the large networks and useable only for hotel

<http://www.oecd.org/daf/competition/Marketdefinition2012.pdf>, at p. 47 (“Cluster markets may, however, result in a deficient market definition if competition between the producers of part of the products restrict the range of possible prices available to the suppliers of the bundle.”).

⁵⁷ McFadden Deposition, at 69:13-15.

⁵⁸ McFadden Deposition, at 55:2-5.

⁵⁹ McFadden Deposition, at 65:17-24 (“Q. Are all iOS apps in your relevant market substitutes for each other? A. I -- I would imagine that some are close substitutes and -- and, for example, different games, to play solitaire, would be probably quite close substitutes across genres. I would expect substitution to be relatively low[.]”).

⁶⁰ Elhauge Report, at ¶ 152 (“The product—iOS app distribution—is the same for every transaction, regardless of genre, even though the apps and in-app products vary between transactions.”).

⁶¹ Elhauge Report, at ¶¶ 166-168.

⁶² Elhauge Report, at ¶ 152.

purchases. Hilton Hotels issued charge cards usable at their hotels prior to launching a general-purpose card in 1958.⁶³ In 1956, the American Hotel Association established the Universal Travelcard, which was usable at participating hotels and car rental agencies.⁶⁴ If such specialized cards were a significant competitive alternative for transactions in this category, it would be appropriate to treat hotel (and perhaps car rental) transactions as a separate market.

57. More recently, a 2020 complaint filed by the Department of Justice that successfully challenged Visa’s proposed acquisition of Plaid recognized that the proposed acquisition involved two companies operating transaction platforms.⁶⁵ However, the Department also recognized the existence of two distinct product markets: online debit transactions and in-person debit payments, arguing that these two products “are not reasonably interchangeable because, unlike online debit payment, the consumer must be physically present in a store.”⁶⁶ The Department contended that only one of the two product markets had the potential to be affected by the transaction.⁶⁷
58. These examples demonstrate that even though credit cards, art galleries, and other two-sided transaction platforms facilitate transactions for all sorts of products, market definition hinges on the availability of substitutes to users on both sides of the platform, and that may well differ by product category.

⁶³ Evans, David S. and Richard Schmalensee, “More Than Money,” In *Paying with Plastic*, MIT Press, Second Edition, December 17, 2004, pp. 53-85, at p. 59

⁶⁴ Evans, David S. and Richard Schmalensee, “More Than Money,” In *Paying with Plastic*, MIT Press, Second Edition, December 17, 2004, pp. 53-85, at p. 55

⁶⁵ Complaint, *United States of America v. Visa Inc. and Plaid Inc.*, No. 3:20-cv-07810, United States District Court for the Northern District of California, San Francisco Division, November 5, 2020, at ¶¶ 20-21 (“Visa provides a two-sided transactions platform that authorizes, clears, and settles debit transactions between businesses, consumers, and banks. [...] Plaid operates the leading financial data aggregation platform in the United States. Its technology allows consumers to connect their bank account information to fintech apps, which enables fintechs to aggregate consumer spending data”).

⁶⁶ Complaint, *United States of America v. Visa Inc. and Plaid Inc.*, No. 3:20-cv-07810, United States District Court for the Northern District of California San Francisco Division, November 5, 2020, at ¶¶ 53-54.

⁶⁷ Complaint, *United States of America v. Visa Inc. and Plaid Inc.*, No. 3:20-cv-07810, United States District Court for the Northern District of California San Francisco Division, November 5, 2020, at ¶¶ 60-61 (“Visa’s Proposed Acquisition of Plaid Would Result in Higher Prices for Online Debit Transactions.”).

59. Professor Elhauge’s approach is also inconsistent with Dr. Evans’ opinion in *Epic*.⁶⁸ Game transactions are not direct substitutes for non-game transactions: consumers looking to purchase a monthly subscription to Pure Sweat basketball likely do not view buying a monthly subscription to the *New York Times* as a substitute, and developers selling their photo editor app likely do not view the PlayStation Store as a relevant substitute when looking to transact with potential consumers.
60. Professor Elhauge also mischaracterizes my statement that “in the case of a transaction platform such as the App Store that supplies one product— transactions” necessarily implies that a relevant product market must encompass all transactions facilitated by a single transaction platform.⁶⁹ On the contrary, as I stated in my *Epic* testimony, a single transaction platform may face different competitive constraints for different types of transactions. If those competitive constraints differ substantially, it will be appropriate to consider the different transactions types to be in separate relevant markets.⁷⁰ Importantly, if competitive conditions are not sufficiently similar, it is inappropriate to cluster markets as Professors Elhauge and McFadden do. Nonetheless, Professor Elhauge fails to analyze whether different app categories in fact face sufficiently similar competitive conditions so that clustering them into a single market is appropriate for the analysis of competitive injury. He simply assumes they do.⁷¹ Even though Consumer Plaintiffs’ expert Professor McFadden defines a single relevant market covering all iOS apps, his treatment of different app categories in his econometric model allows for the possibility that different app categories face different competitive conditions. Even though in his report Professor McFadden allows demand elasticities and other parameters to differ among app categories in his econometric analysis, he does not opine on whether these differences point to the

⁶⁸ Trial Testimony of David Evans, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court Northern District of California, Oakland Division, May 11, 2021, at 1376:7-13 (“Q So is it your opinion that all app transactions in the App Store are substitutes for one another? A No. They’re not substitutes for each other in the same sense that transactions at a restaurant aren’t substitutes for transactions -- payment card transactions at a restaurant aren’t substitutes for payment card transactions at a clothing store.”).

⁶⁹ Elhauge Report, at ¶ 167 and footnote 204.

⁷⁰ Schmalensee Written Direct Testimony, at ¶ 101; Consolidated Initial and Rebuttal Expert Report of Richard Schmalensee, Ph.D., *Epic Games, Inc. v. Apple, Inc.*, No. 4:20-CV-05640-YGR, United States District Court Northern District of California, Oakland Division, March 15, 2021 (“Schmalensee Rebuttal Report”), at ¶ 117.

⁷¹ Elhauge Report, at ¶ 387.

existence of multiple markets.⁷² He does not even acknowledge that clustering might be a factor to consider in his market definition analysis. Like Professor Elhauge, Professor McFadden also fails to analyze whether different app categories (or, for that matter, sub-categories) face sufficiently different competitive conditions to warrant analyzing them as separate markets.

61. In summary, because the App Store is a two-sided transaction platform, the boundaries of the relevant antitrust product market must encompass both sides of the platform, and any assessment of the boundaries of the market must account for the strong indirect network effects between the two sides of the platform. Furthermore, for the purposes of market definition in the context of class certification, the relevant economic question is: what groups of transactions face similar competitive conditions, both from the perspective of developers and end users? Because this case encompasses transactions across all app categories in the App Store, it is critical to carefully analyze the specific market conditions affecting transactions in different app categories. The qualitative and quantitative evidence presented by Professor Hitt and Professor Willig demonstrate that it is inappropriate to define a single relevant market for all iOS transactions.⁷³
62. Professor Hitt’s analyses illustrate the extent of individualized inquiry required to consider two potential relevant markets: digital game transactions and TV and video streaming app transactions.⁷⁴ For digital game transactions, it is reasonable to begin with iOS transactions in the game category, which is by far the largest app category in the App Store.⁷⁵ It is then

⁷² McFadden Report, at ¶¶ 210-211 (“Rather than letting all apps and IAP items have the same coefficients, I let apps that belong to different app categories have different coefficients [...] This modification allows the estimated model to reflect the demand and supply conditions that are specific to each app category.”).

⁷³ Hitt Class Report, at Section 7.1 and ¶¶ 235, 251; Expert Report and Declaration of Robert D. Willig, *Cameron et al. v. Apple Inc. & In Re: Apple iPhone Antitrust Litigation*, No. 4:19-cv-03074-YGR, No. 4:11-cv-06714-YGR, United States District Court for the Northern District of California, Oakland Division, August 10, 2021 (“Willig Report”), at Section VI (“Plaintiffs’ Experts Are Incorrect to Cluster All iOS App Transactions into a Single Relevant Market”), Section VII.A.1 (“Digital game transactions comprise a distinct relevant app transaction market”), and ¶¶ 59, 86.

⁷⁴ Hitt Class Report, at ¶¶ 249-251, Section 7.2.1 (“Example market #1: Digital game transactions”), and Section 7.2.2 (“Example market #2: TV and video streaming app transactions”).

⁷⁵ Deposition of Matthew Fischer, Vol.1, December 18, 2020 (“Fischer Deposition, Vol.1”), at 75:16-19 (“Q. Well, games are, in fact, the largest driver of revenue for the App Store; is that right? A. Games is the -- is the biggest part of the App Store, yes.”).

critical to assess the extent to which game transactions facilitated by other platforms are reasonably substitutable for the game transactions facilitated by the App Store from the perspective of developers and end users. In fact, both game developers and consumers can and do regularly substitute across platforms for game transactions, and the developers of games and the developers of non-game apps are largely distinct.⁷⁶ The relevant product market for game transactions, therefore, is certainly broader than the App Store. Game developers transact with customers across a wide range of transactions platforms, including on consoles such as Sony PlayStation, Microsoft Xbox, Nintendo Switch, as well as on personal computers and mobile devices such as smartphones and tablets.

63. In addition, cloud-based streaming services such as Nvidia GeForce Now, Google Stadia, Sony PlayStation Now, Microsoft Xbox Cloud Gaming, and Amazon Luna may soon become meaningful competitive constraints to all other game transaction platforms.⁷⁷ Microsoft’s xCloud game streaming recently became available on iOS and PC, in addition to Android, and users can play Xbox games on phones, tablets, laptops, and PCs, with no Xbox console required.⁷⁸ The catalog of games available through streaming platforms and across multiple devices is also growing; while Fortnite was not initially available on Nvidia GeForce Now when the latter was introduced on iOS Safari,⁷⁹ it is expected to be available

⁷⁶ Consolidated Initial and Rebuttal Expert Report of Francine Lafontaine, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, March 15, 2021 (“Lafontaine Rebuttal Report”), at ¶¶ 75-80; Consolidated Initial and Rebuttal Expert Report of Lorin Hitt, Ph.D., *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, March 15, 2021 (“Hitt Rebuttal Report”), at ¶¶ 73-77, 124-125.

⁷⁷ See Schmalensee Rebuttal Report, at ¶ 35, for descriptions of these services.

⁷⁸ Peters, Jay, “With xCloud on PC and iOS, cloud gaming’s next big moment has arrived,” *The Verge*, June 29, 2021, available at <https://www.theverge.com/2021/6/29/22555756/xbox-xcloud-cloud-gaming-pc-ios-next-big-moment> (“xCloud is expanding from Android to iOS and PC via the web [...] [N]early anyone who has access to the service can play some of the biggest games on Xbox [...] right inside a browser across phones, tablets, laptops, PCs — and all for just \$15 bucks a month, no \$500 console required.”).

⁷⁹ Eisler, Phil, “GeForce NOW Streaming Comes to iOS Safari,” *NVIDIA*, November 19, 2020, available at <https://blogs.nvidia.com/blog/2020/11/19/geforce-now-on-ios-safari/> (“GeForce NOW is streaming on iOS Safari, in beta, starting today. [...] Once logged in, you’re only a couple clicks away from streaming a massive catalog of the latest and most played PC games. [...] [W]e’re working to enable a touch-friendly version of Fortnite, which will delay availability of the game.”).

on iOS devices in October 2021.⁸⁰ On July 15, 2021, Valve announced the Steam Deck, its portable gaming handheld device, which is designed to emulate the desktop Steam app. Users will be able to access their Steam library as well as install other game stores, download regular PC software, and browse the web.⁸¹ As demonstrated by these examples, the market for digital transactions is evolving rapidly, with new entrants and advances in technology constantly changing the competitive landscape.

64. Having defined a relevant market for game transactions, one cannot simply cluster all other categories of app transactions and define a market for non-game transactions, as Professor Elhauge suggests Apple’s experts did in *Epic*.⁸² This claim couldn’t be further from the truth. In fact, a market definition analysis for the remainder of non-game transactions would certainly uncover significant heterogeneity across and likely within app categories in terms of: reasonably substitutable transaction platforms, alternative devices, presence or absence of marginal costs per transaction, competition among developers, etc.
65. To illustrate this heterogeneity, Professor Hitt considers a relevant product market for TV/video transactions.⁸³ Professor Hitt finds that TV/video transactions, including transactions in the App Store, are a standalone product market with distinct competitive conditions, which include (1) a broad set of alternative devices and transaction platforms (some overlapping with game transaction platforms and others distinct); (2) a mix of subscription and in-app purchase business models among TV/video app developers; and (3) specific App Store policies such as the “Video Partner Program.”⁸⁴ In comparison, games do not fall under the Video Partner Program; the available substitutes for game transactions

⁸⁰ Hilliard, Wesley, “‘Fortnite’ expected to return to iOS in October - on GeForce NOW,” *Apple Insider*, May 6, 2021, available at <https://appleinsider.com/articles/21/05/06/fortnite-expected-to-return-to-ios-in-october---on-geforce-now>.

⁸¹ Peters, Jay, Chaim Gartenberg, Richard Lawler, and Sean Hollister, “Valve’s gaming handheld is called the Steam Deck and it’s shipping in December,” *The Verge*, July 15, 2021, available at <https://www.theverge.com/2021/7/15/22578783/valve-steam-deck-gaming-handheld-pc> (“Valve notes that you’ll be able to plug in a mouse, keyboard, and monitor, and install other game stores, regular PC software, browse the web, and more. [...] Valve says the Steam Deck’s features are designed to emulate the regular Steam app on desktop, complete with chat, notifications, cloud save support, and all of your library, collections, and favorites kept in sync.”).

⁸² Elhauge Report, at ¶¶ 150-151.

⁸³ Hitt Class Report, at Section 7.2.2 (“Example market #2: TV and video streaming app transactions”).

⁸⁴ Hitt Class Report, at ¶ 268.

differ from substitutes for video streaming app transactions; and game developers typically monetize apps differently from video streaming developers.⁸⁵

66. The variation in competitive conditions between game transactions and tv/video transactions highlights why it is inappropriate to define a single cluster market encompassing game transactions and tv/video transactions facilitated by the App Store, and yet when it comes to credit card transactions it may well be that a movie ticket purchase executed using an Amex card is in the same relevant market as an Xbox game purchase at GameStop executed using an Amex card. The reason is simple: when thinking about the two Amex card transactions above, the available alternative transaction platforms are virtually identical in both scenarios, while the arena of competition for game transactions and tv/video transactions are vastly different from each other.
67. In 2020, in-app advertising amounted to about \$46 billion.⁸⁶ As Professor Willig discusses, developers that rely on advertising revenue face trade-offs between prioritizing advertising revenue from an incremental user relative to the marginal cost of an additional user. As Professor Willig demonstrates, in response to a fall in the commission, developers that are heavily reliant on advertising may find that their optimal response to a fall in the commission is to *raise* the price of a paid app.⁸⁷
68. A similarly rigorous market definition analysis that would divide all app transactions in this dynamic marketplace into a set of relevant antitrust markets would be a significant, individualized and fact-intensive undertaking that is well beyond the scope of my assignment. Besides, it is my understanding that plaintiffs have the burden of proving market definition(s), and plaintiffs here have failed to propose any market beyond the plainly overbroad cluster market that includes all iOS app transactions.

⁸⁵ Hitt Class Report, at ¶ 268.

⁸⁶ Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “A Global Perspective on the Apple App Store Ecosystem,” *Analysis Group*, June 2021, at A-8, available at <https://www.apple.com/newsroom/pdfs/apple-app-store-study-2020.pdf> (“Technology research firm Omdia estimated that in-app ad sales for iOS apps were \$46 billion in 2020, with almost \$19 billion (41%) tied to gaming apps.”).

⁸⁷ Willig Report, at ¶¶ 230-231.

2. *Professor Elhaug’s Hypothetical Monopolist Test Ignores Indirect Network Effects and Therefore Provides No Reliable, Relevant Evidence*

a) Overview of SSNIP Test in the Context of Two-Sided Transaction Platforms Such as the App Store

69. To operationalize the delineation of the relevant product and geographic markets for single-sided businesses, particularly in the merger context, antitrust practitioners often rely on the hypothetical monopolist test. The test involves assessing whether a hypothetical profit-maximizing firm, not subject to price regulation, that was the only present and future seller of a set of products that arguably make up a relevant market likely would find it profitable to impose at least a small but significant and non-transitory increase in price (SSNIP) on at least one product in the market.⁸⁸ If a SSNIP on a candidate market does not increase the hypothetical monopolist’s profit, then it is said the candidate market is too narrow, and more products should be added into the candidate market until such a price increase would increase the hypothetical monopolist’s profit. For example, to determine whether for digital game transactions the App Store is a relevant product market (or, in the alternative, that other digital game transaction platforms should also be included in the relevant product market), a hypothetical monopolist test could help determine whether a SSNIP on the price charged by the App Store would result in sufficient developers and consumers switching away from the App Store to render the SSNIP unprofitable. If so, then the App Store as a product market for digital game transactions is too narrow and the product market needs to be expanded.⁸⁹
70. The application of a conventional one-sided hypothetical monopolist test to only one side of a transaction platform would be inappropriate in this context, because it would ignore the indirect effect that a price increase would have on participation of the other side, which in turn would lower the participation of the tested side. By not accounting for indirect network effects, the one-sided hypothetical monopolist test would underestimate the loss in

⁸⁸ “Horizontal Merger Guidelines,” *U.S. Department of Justice and the Federal Trade Commission*, August 19, 2010, at p. 9.

⁸⁹ When the evidence necessary to perform the hypothetical monopolist test quantitatively is not available, the conceptual framework of the test provides a useful methodological tool for gathering and analyzing evidence pertinent to customer substitution and to market definition. See “Horizontal Merger Guidelines,” *U.S. Department of Justice and the Federal Trade Commission*, August 19, 2010, at p. 12.

profits due to an increase in price. As a consequence, the one-sided hypothetical monopolist test might incorrectly predict a positive increase in profit for the hypothetical monopolist from a SSNIP, and the market would be defined too narrowly.⁹⁰

71. Even if the hypothetical monopolist test is applied on both sides of the transaction platform, the correct application of the hypothetical monopolist test to markets involving platforms turns out to be quite complex.⁹¹ First, the presence of indirect network effects may make its quantitative application impractically complex, since strengths of indirect network effects are typically hard to quantify. Second, because a platform sets a price structure instead of a single price, there is no consensus among economists as to which price the SSNIP should be applied to and how the price structure should be adjusted.⁹² Economists have proposed different versions of the hypothetical monopolist test for platform markets.⁹³ Regardless of which approach one follows, the data requirements of a quantitative hypothetical monopolist test in a two-sided setting are significantly higher than that of a hypothetical monopolist test applied to a single-sided business. While the hypothetical monopolist test for a single-sided market only requires one firm’s margin and the own price elasticity of demand, two-sided hypothetical monopolist test requires many more—own and cross price elasticities of demand, prices, sales, costs, and the strengths of indirect externalities.⁹⁴

⁹⁰ “Rethinking Antitrust Tools for Multi-Sided Platforms,” *OECD*, 2018, available at <https://www.oecd.org/daf/competition/Rethinking-antitrust-tools-for-multi-sided-platforms-2018.pdf>, at p. 46.

⁹¹ Evans, David and Richard Schmalensee, “The Antitrust Analysis of Multisided Platform Businesses,” In Roger D. Blair and D. Daniel Sokol (Eds.), *Oxford Handbook of International Antitrust Economics*, Oxford, 2015, pp. 404-447, at p. 406 (“The economics literature that has developed since 2000 shows robustly that many results derived from models of one-sided businesses generally do not apply to multisided platforms that serve different interdependent customer groups.”).

⁹² Filistrucchi, Lapo, “A SSNIP Test for Two-Sided Markets: The Case of Media,” *NET Institute Working Paper*, October 2008, at p. 3. (“[I]t is not a priori clear whether the hypothetical monopolist should be thought of as raising a) the price level while optimally adjusting the price structure b) both prices together keeping fixed the price structure c) each of the two prices separately allowing the other price to be adjusted optimally d) each of the two prices while keeping the other price fixed.”).

⁹³ See, e.g., Evans, David and Michael Noel, “Analyzing Market Definition and Power in Multi-sided Platform Markets,” *SSRN*, October 21, 2005; Filistrucchi, Lapo, “A SSNIP Test for Two-Sided Markets: The Case of Media,” *NET Institute Working Paper*, October 2008, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1287442.

⁹⁴ See Filistrucchi, Lapo, “A SSNIP Test for Two-Sided Markets: The Case of Media,” *NET Institute Working Paper*, October 2008, at p. 16. See also Auer, Dirk and Nicholas Petit, “Two-sided Markets and the Challenge of Turning Economic Theory into Antitrust Policy,” *The Antitrust Bulletin*, 60(4), 2015, pp. 426-

b) Professor Elhauge’s Hypothetical Monopolist Test Is Uninformative and Is Inconsistent with the Academic Literature

72. Professor Elhauge’s hypothetical monopolist tests ignore all of the complexities discussed in the academic literature related to the correct application of a hypothetical monopolist test to markets involving platforms. Professor Elhauge brushes aside the issues related to which side’s price the SSNIP should be applied, with the assertion that in practice no app distribution platform charges a fee to consumers for participation,⁹⁵ and only briefly asserts—without evidence or explanation—that in his view not allowing the platform to optimally adjust its price structure is “conservative.”⁹⁶ Professor Elhauge also does not bother with the quantitative application of the SSNIP test, including the quantification of the strengths of indirect network effects or the measurement of the effect of a SSNIP on transaction volume.
73. Instead, Professor Elhauge positions the hypothetical monopolist test as a very simple question: is the profit-maximizing price of a 100% monopolist at least 5% higher than the prevailing price if the market had been competitive?⁹⁷ To answer this question, Professor Elhauge asserts that Apple is essentially a 100% monopolist in iOS app distribution and that it is already exercising its market power to sustain prices that are far more than 5% above competitive levels.⁹⁸ To support this claim, Professor Elhauge compares Apple’s average commission rates that he calculates to two yardstick commission rates computed by Professor Economides and the but-for commission rate calculated by Dr. Evans in *Epic* and claims to find that “Apple’s commissions are far more than 5% higher than commissions in competitive markets.”⁹⁹

461, at p. 453 (“[I]t is unclear how to operationally simulate the effects on demand.”). For a two-sided critical loss analysis, see Evans, David and Michael Noel, “Analyzing Market Definition and Power in Multi-sided Platform Markets,” *SSRN*, October 21, 2005, at pp. 26-38. The test also requires estimating the own and cross price elasticities, but are likely to be biased without proper instruments.

⁹⁵ Elhauge Report, at ¶ 110.

⁹⁶ Elhauge Report, at ¶ 111.

⁹⁷ Elhauge Report, at ¶ 105.

⁹⁸ Elhauge Report, at ¶ 106.

⁹⁹ Elhauge Report, at ¶¶ 112-119.

74. Professor Elhauge claims that using either of Professor Economides’ yardsticks inherently accounts for indirect network effects because the comparator firms are also two-sided platforms with indirect network effects.¹⁰⁰ This claim is incorrect and highly misleading. Neither Professor Elhauge nor Professor Economides provide any evidence that the pattern and intensity of indirect network effects are the same for Professor Economides’ comparators and the App Store. Quantifying the magnitude of indirect network effects is a highly data-intensive exercise, which requires measuring within-platform and cross-platform cross-side externality elasticities to capture the indirect network effects.¹⁰¹ These elasticities depend, among other things, on the usage patterns of the two sides of the platform, the number of users on each side of the platform, the extent of switching costs and lock-in each side face, the number of alternative transactions platforms each side has available, etc. Professors Elhauge and Economides did not undertake such an analysis.
75. Professor Economides’ “commission rate yardstick” is his so-called Windows app distribution market, where Professor Economides includes first-party and third-party PC app stores.¹⁰² First-party app stores that distribute their own apps directly to consumers are not even two-sided, and therefore do not face any indirect network effects between the two-sides of a two-sided platform. Moreover, two of the three third-party stores—Steam and Epic Games Store—are primarily digital game transaction platforms that operate cross-platform on multiple operating systems. As such, there is no reason to believe that the indirect network effects in Professor Economides’ Windows app distribution market are comparable to those in the iOS ecosystem.
76. Professor Economides “rival profit yardstick” rests on the average of operating profit margins, ranging widely from 6.0 % to 44.3%, of a set of online retailers: eBay, Rakuten,

¹⁰⁰ Elhauge Report, at ¶ 118.

¹⁰¹ Filistrucchi, Lapo, “A SSNIP Test for Two-Sided Markets: The Case of Media,” *NET Institute Working Paper*, October 2008, at p. 16 (“All in all, it is therefore clear that in order to perform the SSNIP test, in both the US and the EU version, one should not only estimate the own and cross elasticities of demand with respect to price and observe prices, sales and per unit costs on both sides of the market but also estimate the cross market network externalities.”) and p. 21 (“Yet, looking at the formulas, it is evident that data requirements for the implementation of the SSNIP test in two-sided markets, in both its US and EU versions, are higher than in a single –sided market as one needs to estimate not only the matrixes of the price elasticities of demand on each side of the market but also the matrixes of the price elasticities across sides of the market.”).

¹⁰² Economides Report, at ¶¶ 35-36, 38-39.

Alibaba, MercadoLibre, and Etsy.¹⁰³ None of these platforms primarily handles digital goods, however, and they operate in a variety of settings and using business models that are not comparable to that of the App Store.¹⁰⁴ In addition, there is no reason to believe, *ex ante*, that the indirect network effects of these comparators are similar to those of the App Store. Mr. Tregillis, who performed the operating margin analysis upon which Professor Economides bases his “rival profit yardstick” analysis, confirmed in his deposition that he had not performed a comparability analysis and that he had no opinion as to whether the five companies were comparable to the App Store.¹⁰⁵ Mr. Tregillis had simply been provided the list of companies by counsel and neither understood why they were selected nor attempted an independent search to identify comparator companies.¹⁰⁶ The substantial differences in their average profit rates certainly suggest substantial differences in competitive conditions and/or business models within the group.

77. In its setup, Professor Elhauge’s hypothetical monopolist test is similar to Dr. Evans’ aftermarket SSNIP test in *Epic*; like Dr. Evans, Professor Elhauge’s proposed candidate market of iOS app distribution has only one seller, the Apple App Store. A single-firm SSNIP test is problematic because if any individual business is maximizing profits then, by definition, it could not increase profits by raising prices. Unlike Dr. Evans, however, whose SSNIP test attempted to assess whether the App Store, acting alone, could profitably

¹⁰³ Economides Report, at ¶¶ 40-55; *See, e.g.*, ¶ 43.

¹⁰⁴ In his expert report, Mr. Malackowski describes in detail some of the important differences among these platforms and between them and the App Store. *See* Expert Report and Declaration of James E. Malackowski, *Cameron et al. v. Apple Inc. & In Re: Apple iPhone Antitrust Litigation*, No. 4:19-cv-03074-YGR, No. 4:11-cv-06714-YGR, United States District Court for the Northern District of California, Oakland Division, August 10, 2021 (“Malackowski Class Report”), at ¶¶ 276-284. *See* Malackowski Class Report, at ¶¶ 278-283 for a description of each store.

¹⁰⁵ Deposition of Christian Tregillis, August 2, 2021 (“Tregillis Deposition”), at 157:10-17 (“Q Let’s start with the first company that you looked at, eBay. Just to be clear, you offered no opinion about whether eBay is a comparable marketplace to the App Store, right? A Yes. And I’ll give you the same answer for each of the other comparable companies, if that will help you.”) and 161:11-15 (“Q You didn’t consider, for example, if Etsy is a marketplace that sells apps? A Anything regarding comparability, my answer is that I did not form an -- perform an analysis of comparability.”).

¹⁰⁶ Tregillis Deposition, at 149:18-150:2 (“Q Do you know who identified those five companies? A For my purposes, I received the list from counsel. Q Do you have any understanding -- other understanding as to how those five companies were selected? A I believe it was Dr. Economides, but I don’t really know much in the way of detail about that.”) and 153:22-25 (“Q You engaged in no independent search or analysis for comparable companies, correct? A That’s right, not to identify comparable companies.”).

increase price,¹⁰⁷ Professor Elhauge tests whether the App Store’s commission, as is, is higher than the competitive commissions, as measured by Professor Economides.

78. I agree with Professor Elhauge that the way to avoid the inverse *Cellophane Fallacy*, to which Dr. Evans fell victim, is to use an estimate of the competitive price rather than the prevailing price.^{108,109,110,111} However, to be reliable, one must have a reliable estimate of prices in the “competitive” market and in the “monopoly” market. Professor Elhauge’s analysis falls short on both counts. Professor Elhauge does not opine on what the competitive commission that would prevail with unrestrained competition in the domestic iOS app distribution market. Rather, he relies on Professor Economides’ two yardsticks for the but-for world commission rate in the iOS app distribution market.¹¹² Professor Elhauge then compares these yardsticks to 28.4%, which he claims is Apple’s “average commission from the start of the class period (June 4, 2015) to the end of Apple’s transaction data

¹⁰⁷ Evans Written Direct Testimony, at ¶ 258.

¹⁰⁸ Schmalensee Rebuttal Report, at ¶ 133 (“Professor Evans’ interpretation of his SSNIP test suffers from an inverse Cellophane Fallacy. Professor Evans claims that Apple is a monopolist in the aftermarket, and therefore Apple’s profit-maximizing price should already be above the competitive level, and yet Professor Evans’ SSNIP test finds that Apple as a monopolist could still raise price even beyond the allegedly monopolistic price it already charges.”).

¹⁰⁹ Professor Elhauge agrees with my assessment that Professor Evans’ finding that the App Store could in fact increase price can only imply that “(1) either Apple and/or the expert doing the analysis made a mistake when trying to estimate the profit maximizing price; or (2) Apple is, contrary to economic assumptions, not trying to profit-maximize.” See Elhauge Report, at ¶ 108.

¹¹⁰ For an example of the *Cellophane Fallacy*, see Opinion, *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, Supreme Court of the United States, June 11, 1956. See, e.g., Baker, Jonathan, “Market Definition: An Analytical Overview,” *Antitrust Law Journal*, 74(1), 2007, at p. 164 (“This possibility is termed the Cellophane fallacy. The problem arises because firms exercising market power may boost prices to a point at which further price increases are made unprofitable, constrained by the threat of demand substitution. Under such circumstances, an approach to market definition that infers buyer substitution from a small hypothetical price increase over the currently prevailing price—the usual practice in market definition analysis when the alleged harm to competition is prospective—may make buyer substitution appear to be greater than it was when price was at the noncollusive (but-for) price level, under the plaintiff’s view that the but-for price was lower.”).

¹¹¹ Schaerr, Gene, “The Cellophane Fallacy and the Justice Department’s Guidelines for Horizontal Mergers,” *Yale Law Journal*, 94(3), 1985, pp. 670-693, at pp. 676-677 (“In industries characterized by market power (e.g., because of collusion or monopoly) the prevailing price is usually higher than competitive price. When applying the Guidelines to mergers in such industries, however, DOJ applies the five-percent test to the prevailing price rather than to the competitive price. [...] [T]he overall market, therefore, may be substantially larger. Such overstatement of the size of the market leads to understatement of the market power...”).

¹¹² Elhauge Report, at ¶¶ 113, 116.

(September 2019).”¹¹³ This comparison is completely meaningless, for a number of reasons.

79. First, Professor Elhauge is comparing apples to oranges, because Professor Economides’ yardsticks do not temporally align with Professor Elhauge’s average commissions. As I discuss in detail in **Section VI.B**, Professor Economides does not analyze whether the prevailing average commission rates have varied over time across the platforms chosen for their yardsticks. He offers a static view of the but-for world, and his but-for commissions similarly do not vary over time. For example, Professor Economides’ analysis of the platforms that distribute Windows PC apps focuses on commission rates observed in 2019 and ignores the evolution of these commission rates throughout the developer class period.¹¹⁴ On the other hand, Professor Elhauge’s average commission spans over four years, during which time the App Store’s average commission rate has steadily decreased.¹¹⁵
80. Second, Professor Elhauge’s estimates of the App Store’s average commission rate is flawed and considerably overstates the Apple App Store’s actual effective commission rate. As Professor Hitt demonstrates, the effective commission rate for all app transactions was 4.7 percent in 2019, and will decrease as a result of the commission reductions from the new App Store Small Business program.¹¹⁶
81. Third, Professor Economides’ yardstick based on Windows PC stores also includes commission rates on direct distribution.¹¹⁷ This is plainly incorrect, because a yardstick approach to estimating the but-for world commission rate for two-sided platforms should be

¹¹³ Elhauge Report, at ¶ 105. He argues that competitive commissions below 27% would signal monopoly, since 28.4% “is 5 percent higher than 27.0%.” See *id.*, at ¶¶ 112-113.

¹¹⁴ Economides Report, at ¶¶ 36-39, Table 4.

¹¹⁵ Hitt Rebuttal Report, at ¶ 394, Exhibit 62, Exhibit 63.

¹¹⁶ Written Direct Testimony of Lorin Hitt, Ph.D., *Epic Games, Inc. v. Apple, Inc.*, No. 4:20-CV-05640-YGR-TSH, United States District Court for the Northern District of California, Oakland Division, April 23, 2021 (“Hitt Written Direct Testimony”), at ¶ 256.

¹¹⁷ Economides Report, at ¶ 38. It became clear in his deposition that the [REDACTED] in his Table 4 omits substantial fixed costs, which he agrees are incurred. See Economides Deposition, at 176:7-12 (“Q. And -- and if it did, that developer to self-distribute through its own store would require -- incur a payment of [REDACTED] of 100 million, which would be a total of [REDACTED] per year, correct? A: Yes.”).

based on the two-sided platform yardsticks. On the Windows PC direct distribution has existed alongside two-sided platforms and yet third-party app stores have continued to charge commission rates comparable to that of the App Store. Throughout most of the relevant period, a number of two-sided platforms (Steam, the Windows Store, and GOG.com) that distributed Windows apps charged 30% headline commission rates, as did the App Store.¹¹⁸ This is consistent with the App Store’s commissions being competitive.

82. Finally, as noted above, Professor Economides “rival profit yardstick” rests on the operating profit rates of a set of transaction platforms that do not handle primarily digital transactions and that differ from the App Store in many other ways. Importantly, unlike those platforms, the App Store is part of an ecosystem involving sales of devices and earning returns on huge investments in intellectual property.¹¹⁹ Following roughly in the footsteps of Dr. Evans in the Epic case,¹²⁰ as he and Professor Elhauge acknowledge,¹²¹ Professor Economides proceeds to make a set of arbitrary assumptions regarding competitive entry and its consequences for operating profits that are unsupported by economic theory or evidence and employs them to come up with a completely indefensible competitive benchmark rate.¹²² Professor Lafontaine’s description of Dr. Evans’ similar analysis applies here as well: what Professor Economides “has produced in reality is an algebraic exercise, not an economic analysis.”¹²³

¹¹⁸ See Exhibit 4.

¹¹⁹ Malackowski Class Report, at ¶¶ 275, 284.

¹²⁰ Opening Expert Report of David Evans, *Epic Games, Inc., v. Apple, Inc.*, No. 4:20-CV-05640-YGR-TSH, United States District Court for the Northern District of California, Oakland Division, February 15, 2021, at ¶¶ 514-515 (“The App Store’s profits come from its monopoly control over app distribution. [...] Meanwhile app store entry would have forced Apple to compete away some of its profits, through providing more and better service, greater innovation, and lower prices, that also would have benefited iPhone owners and iOS developers. Below I show that a modest amount of entry would force the prices paid by iOS users and developers down substantially while still leaving the App Store far more profitable than other online marketplaces.”).

¹²¹ Economides Report, at ¶ 55; Elhauge Report, at ¶¶ 116-118.

¹²² Economides Report, at ¶¶ 47-53.

¹²³ Lafontaine Written Direct Testimony, at ¶ 113 (“What Dr. Evans has produced in reality is an algebraic exercise, not an economic analysis. Instead of modeling the economic behavior of firms, Dr. Evans looks for the commission rate that makes a certain equation true. However, that equation is derived not from standard economic principles, industry data, or optimal firm behavior, but rather from a long list of arbitrary assumptions that Dr. Evans has not properly supported and that are not based on economic logic.”).

83. In conclusion, neither Professor Elhauge’s average App Store commission rate nor Professor Economides’ yardsticks are reliable inputs into a hypothetical monopolist test applied to iOS app distribution. Therefore, Professor Elhauge’s hypothetical monopolist test provides no information as to whether iOS app distribution is a relevant antitrust market. Instead, the facts on the ground are clear: the App Store established its pricing structure well before it could credibly be alleged to have any monopoly power, and it has only reduced its commissions over time.¹²⁴ My analysis of the historical actual world headline commission rates in **Section V.A** illustrates that Apple’s headline commission rate has been in line with comparable online stores.

B. Implications for Assessing Market Power

84. The textbook definition of market power refers to the ability of a firm to profitably raise price above competitive levels for a sustained period of time.¹²⁵ Economists recognize, however, that if this definition is applied literally, almost every firm would be found to possess some degree of market power; therefore, only substantial and durable market power raises antitrust concerns.¹²⁶ Evidence of market power typically falls into one of two broad categories: the analysis of market outcomes and the assessment of structural evidence.

¹²⁴ See the discussion at ¶¶ 280-282.

¹²⁵ Baker, Jonathan and Timothy Bresnahan, “Economic Evidence in Antitrust: Defining Markets and Measuring Market Power,” In Paolo Buccirossi (Ed.), *Handbook of Antitrust Economics*, MIT Press, 2008, pp. 1-42, at p. 15 (“Market power—the ability of firms to raise price above the competitive level for a sustained period—is a part of the legal framework in multiple antitrust contexts.”); Carlton, Dennis W. and Jeffrey M. Perloff, *Modern Industrial Organization, Global Edition, 4th ed.*, Pearson Education, 2015, at p. 666 (“A firm (or group of firms acting together) has market power if it is profitably able to charge a price above that which would prevail under competition, which is usually taken to be marginal cost.”).

¹²⁶ Carlton, Dennis W. and Jeffrey M. Perloff, *Modern Industrial Organization, Global Edition, 4th ed.*, Pearson Education, 2015, at pp. 666-667 (“If this definition is applied literally, probably every firm in the United States has at least a tiny bit of market power. [...] Therefore, presumably, when courts find that a firm has market power, they must mean that the firm has a substantial amount of market power for some significant period of time.”); See also Krattenmaker, Thomas G., Robert H. Lande, and Steven C. Salop, “Monopoly Power and Market Power in Antitrust Law,” *Georgetown Law Journal*, 1987, available at <https://www.justice.gov/atr/monopoly-power-and-market-power-antitrust-law> (“Of course, different antitrust issues may, upon analysis, require different degrees or probabilities of anticompetitive economic power to prove a violation. For example, we may require a strong showing of a substantial degree of monopoly power before condemning practices that often can generate substantial efficiencies”); Posner, Richard A. and William M. Landes, “Market Power in Antitrust Cases,” *Harvard Law Review*, 94(5), March 1981, pp. 937-996, at p. 937 (“A finding of monopolization in violation of section 2 of the Sherman Act requires an initial determination that the defendant has monopoly power - a high degree of market power. A lesser but still significant market power requirement is imposed in attempted-monopolization cases under section 2.”);

85. The analysis of market outcomes relates to the effects of actions alleged to involve the exercise of market power on prices and output. Structural evidence links market conditions to the likelihood of market power, and typically involves the calculation of firms’ market shares and market concentration.¹²⁷ A pre-requisite to this latter type of analysis is defining a relevant market, identifying market participants, and choosing the appropriate unit of measurement for market shares.¹²⁸ In addition, the assessment of barriers to entry and the ability of rivals to expand output affect the extent to which market conditions can be used reliably to establish a firm’s market power.¹²⁹
86. Although the basic principles underpinning the assessment of market power are the same in the context of single-sided businesses and two-sided transaction platforms, the fact that two-sided transaction platforms simultaneously compete for two distinct customer groups has important ramifications for analyzing a platform’s market power.

“Monopolization Defined,” *Federal Trade Commission*, available at <https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/single-firm-conduct/monopolization-defined>, accessed on February 14, 2021 (“Courts do not require a literal monopoly before applying rules for single firm conduct; that term is used as shorthand for a firm with significant and durable market power — that is, the long term ability to raise price or exclude competitors. That is how that term is used here: a “monopolist” is a firm with significant and durable market power.”).

¹²⁷ Davis, Peter J. and Eliana Garcés, *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton University Press, 2010, at pp. 285–286; Carlton, Dennis W. and Jeffrey M. Perloff, *Modern Industrial Organization, Global Edition, 4th ed.*, Pearson Education, 2015, at p. 668.

¹²⁸ *Market Power Handbook: Competition Law and Economic Foundations*, 2nd Ed., American Bar Association, 2012, at p. 71; “Horizontal Merger Guidelines,” *U.S. Department of Justice and the Federal Trade Commission*, August 19, 2010, at pp. 16–17 (“The Agencies normally calculate market shares for all firms that currently produce products in the relevant market, subject to the availability of data. [...] In most contexts, each firm’s market share is based on its actual or projected revenues from the targeted customers. However, the Agencies may instead measure market shares based on revenues from a broader group of customers if doing so would more accurately reflect the competitive significance of different suppliers in the relevant market. Revenues earned from a broader group of customers may also be used when better data are thereby available.”).

¹²⁹ Krattenmaker, Thomas, Robert Lande, and Steven Salop, “Monopoly Power and Market Power in Antitrust Law,” *Georgetown Law Journal*, 1987, available at <https://www.justice.gov/atr/monopoly-power-and-market-power-antitrust-law> (“If the widget market is sufficiently concentrated and there are barriers to entry and expansion in the market, perhaps as a result of the cost increasing strategy, then the widget producers may be able to restrain output and raise price still further.”).

1. *Implications for Assessing Market Outcomes*

a) Overview

87. For a transaction platform with a simple price structure, the relevant price is the total transaction price or commission charged—in absolute or percentage terms—when a transaction between a buyer and seller occurs. The average transaction price charged by payment card systems was the price measure considered in the *Amex* case.¹³⁰ A platform that has market power may restrict output by increasing that usage fee. Of course, platforms may charge access fees as well as usage fees, and, as here, may charge very different transaction prices on different sorts of transactions. When a pricing structure is complex and the mix of transactions changes over time, a single unambiguously “best” summary measure of price may not exist.
88. As discussed above, unlike one-sided businesses, two-sided platforms tend to have a skewed pricing structure. Platforms often charge zero or even a negative price to one side if demand is highly price-sensitive and/or if its participation is critical to attracting members of the other side.¹³¹ Furthermore, the profit-maximizing, non-predatory price charged on one side may be above, equal, or below the marginal cost specific to that side.¹³²
89. The App Store collects no commission from the user when the user purchases digital content, which suggests that the App Store sets price below the marginal cost on the user side. Similarly, neither the fact that the App Store charges developers nothing for 84 percent of transactions (beyond the annual \$99 access fee) nor the fact that it charges a commission of 30 percent on some transactions demonstrates the App Store’s market

¹³⁰ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 17 (“The plaintiffs did offer evidence that Amex increased the percentage of the purchase price that it charges merchants by an average of 0.09% between 2005 and 2010.[...] The plaintiffs believe that this evidence shows that the price of Amex’s transactions increased.”).

¹³¹ Niels, Gunnar, “Transaction versus Non-Transaction Platforms: A False Dichotomy in Two-Sided Market Definition,” *Journal of Competition Law and Economics*, 15(2-3), 2019, pp. 327-357, at pp. 341-342.

¹³² Evans, David, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, 20, 2003, pp. 325-381, at p. 359, available at <https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=1144&context=yjreg> (“[T]here is no necessary relationship between price and marginal cost on any side of multi-sided platform markets. In fact, the price on one side of the market could be well above marginal cost, while the price on the other side of the market could be below marginal cost.”).

power—or lack thereof. Rather, the App Store’s asymmetric and complex pricing structure reflects differences in the price elasticities of the two sides and the strengths of the indirect effect that each exerts on the other,¹³³ and a desire to encourage small developers and free apps.

90. As I discussed above in **Section IV.A**, evidence of price increase on one side of a two-sided transaction platform is not enough to demonstrate an anti-competitive exercise of market power because it does not take into account indirect network effects. In a two-sided market, analyzing a platform’s incentive to raise price on one side of the platform must take into consideration both the direct price effect and the indirect network effects. Just like a single-sided market, the direct effect of an increase in price reduces the participation of that side. An additional layer of the two-sided market is the indirect network effect, which further reduces the participation of both sides. Even if the direct effect of a price increase is small, it may not be profitable for a platform to raise price if indirect network effects are strong.¹³⁴ In addition, even if one observes a price increase on one side of a platform, one cannot simply conclude that this will reduce output. If the price increase on that side is paired with a price decrease on the other, the price decrease will draw more users on that side, which in turn will draw more users on the side that faces the price increase. The net effect on that side may well be positive, and so the result of the change in price structure could lead to an overall increase in the number of transactions. In fact, the App Store has only reduced elements of its price structure over time, demonstrating that it has not exercised market power—particularly in the absence of any showing of a restriction of market output or reduction of quality.¹³⁵

¹³³ Niels, Gunnar, “Transaction versus Non-Transaction Platforms: A False Dichotomy in Two-Sided Market Definition,” *Journal of Competition Law and Economics*, 15(2-3), 2019, pp. 327-357, at pp. 341-342 (“Typically the platform will set a lower (or zero, or even a negative) price on the side which exerts a stronger externality on the other side.”). *See also id.*, at p. 342 (“The charging structure is also influenced by the own-price elasticity on each side.”).

¹³⁴ Auer, Dirk and Nicolas Petit, “Two-Sided Markets and the Challenge of Turning Economic Theory into Antitrust Policy,” *The Antitrust Bulletin*, 60(4), 2015, pp. 426-461, at p. 450, available at <https://journals.sagepub.com/doi/abs/10.1177/0003603X15607155> (“Losing demand on one side of the market can have an impact on the number of users present on the other side, making the platform less profitable.”).

¹³⁵ *See* the discussion at ¶¶ 280-282.

91. In assessing the App Store’s market power, one needs to consider if Apple could profitably reduce output in the relevant markets by increasing the prices charged to users and developers above competitive levels. This analysis would need to consider the indirect network effects that link the participation of consumers and developers, since the strength of those effects would have implications for how much the App Store could increase its prices above competitive levels. Moreover, the analysis of market power should be conducted separately in each relevant market in which the App Store participates, taking into account the variation of indirect network effects across those markets. Thus, even if Plaintiffs’ experts had shown that the App Store had market power in a *single* relevant market, which they have not done, this evidence would not be sufficient to conclude that they have market power in *any* remaining relevant markets that they failed to analyze. Professor Elhauge failed to perform such analysis because he clustered all app categories thus assuming that they all face identical competitive conditions. Professor McFadden makes a similar mistake as he clusters all application genres within a cluster market even though in his deposition he argued that “game markets are a distinct market for some purposes.”¹³⁶
92. In addition, the presence of indirect network effects links the attractiveness of the App Store to developers and consumers to Apple’s competitiveness in the market(s) for mobile devices. This linkage will further diminish any incentive to raise the App Store prices above competitive levels.

b) Analysis of the App Store’s Operating Profit Margin Does Not Demonstrate that It Has Monopoly Power

93. As evidence of Apple’s purported monopoly power in app distribution, Plaintiffs’ experts all point to the supposedly high operating margins earned by Apple from the App Store. Professor McFadden claims that Apple’s “exclusive control of sales through the Apple App Store” provides almost a 100 percent share of sales which “is reflected in the Apple App Store’s relatively high margins.”¹³⁷ Professor Economides similarly states that “Apple’s

¹³⁶ McFadden Deposition, at 69:9-15 (“[I]f for other economic purposes you want to define the market narrowly to limit it to close substitutes, then -- then sub- -- submarkets may -- may be important for that purpose. So it may be that -- that game -- game markets are a -- a distinct market for some purposes.”).

¹³⁷ McFadden Report, at ¶ 12.

App Store is extraordinarily profitable.”¹³⁸ There are several basic problems with this argument.

94. First, high accounting profitability, even of a stand-alone business, does not establish the existence of market power, let alone monopoly power. It is well-known that accounting profitability can be a very poor measure of true, economic profitability, particularly for businesses that make substantial investments in intellectual property.¹³⁹ Moreover, while a persistently high economic profit rate is suggestive of market power, it is by no means dispositive.
95. Second, despite Professor Elhauge’s extraordinary and unsupported assertion that his opinions are based on economic profitability,¹⁴⁰ a business’s operating margin is simply not an estimator of its economic profitability. Economic *profit* is, roughly, accounting profit minus the opportunity cost of the capital invested in the business – usually defined as the returns that could be earned in a comparably risky alternative investment.¹⁴¹ Economic

¹³⁸ Economides Report, at ¶ 19.

¹³⁹ Fisher, Franklin M. and John J. McGowan, “On the Misuse of Accounting Rates of Return to Infer Monopoly Profits,” *American Economic Review*, 73(1), 1983, pp. 82-97, at p. 82 (“[A]ccounting practices do not provide for the capitalization of certain activities such as research and development and [...] accounting rates of return, even if properly and consistently measured, provide almost no information about economic rates of return.”); Bork, Robert H. and J. Gregory Sidak, “The Misuse of Profit Margins to Infer Market Power,” *Journal of Competition Law & Economics*, 9(3), 2013, pp. 511–530, at pp. 514-515 (“It is in the measurement of capital costs that economic and accounting profits differ. [...] Therefore, accounting profits need not equal economic profits, nor is there any direct relationship between accounting and economic profits.”).

¹⁴⁰ Elhauge Deposition, at 307:14-20 (“Q. Is it your testimony that your opinions based on Apple’s profitability are based on economic profits? A. Yes. Q. And is it your testimony that you calculated accurately Apple’s economic profits? A. Yes.”).

¹⁴¹ Pindyck, Robert S. and Daniel L. Rubinfeld, *Microeconomics: Eighth Edition*, Pearson Education, 2013, at pp. 301-302 (“[I]t is important to distinguish between accounting profit and economic profit. [...] Economic profit takes into account opportunity costs. One such opportunity cost is the return to the firm’s owners if their capital were used elsewhere. Suppose, for example, that the firm uses labor and capital inputs; its capital equipment has been purchased. Accounting profit will equal revenues R minus labor cost wL , which is positive. Economic profit p , however, equals revenues R minus labor cost wL minus the capital cost, rK ”); Mankiw, N. Gregory, *Principles of Economics: Sixth Edition*, Cengage Learning, 2011 at pp. 261-262 (“As we have already noted, economists and accountants treat costs differently, and this is especially true in their treatment of the cost of capital. [...] Because economists and accountants measure costs differently, they also measure profit differently. [...] Notice that because the accountant ignores the implicit costs, accounting profit is usually larger than economic profit.”); Hubbard, R. Glenn and Anthony Patrick O’Brien, *Microeconomics: Seventh Edition*, Pearson Education, 2019, at p. 458 (“Don’t Let This Happen to You. Don’t Confuse Zero Economic Profit with Zero Accounting Profit. Remember that economists count the opportunity cost of the owner’s investment in a firm as a cost. Suppose you invest \$200,000 opening a pizza parlor, and the return you could earn on those funds each year in a similar investment—such as opening a sandwich shop—is 10

profitability is economic profit expressed as a rate of return on that invested capital.

Plaintiffs’ experts all ignore the fundamental point that a business’s profitability cannot be assessed without at least an estimate of the capital invested in it, and operating margins do not embody any information on invested capital.

96. A simple example may be useful. Consider two factories that produce identical widgets and sell them in a competitive market. One factory has made substantial investments in machinery; the other has not and, consequently, uses much more labor per widget. Because it has a lower variable cost (labor plus materials) per widget, it will automatically have a higher gross margin than the second. Nonetheless it could have over-invested in machinery and could be earning a low rate of return on its invested capital and thus have low profitability, properly measured.
97. Finally, because Apple uses its intellectual property to compete in multiple markets at the same time, it makes no sense to try to measure the App Store’s profitability in isolation. The App Store is a part of the iOS platform and relies on all of Apple’s intellectual property to drive transactions between developers and consumers. The costs associated with Apple’s intellectual property are joint costs that, despite Professor Elhauge’s extraordinary assertion to the contrary,¹⁴² as a matter of basic economic principles there is generally no formulaic

percent. [...] So, you would end up breaking even and earning zero economic profit, even though you were earning an accounting profit of \$20,000.”).

¹⁴² Elhauge Deposition, at 309:20-310:15 (“Q. As a matter of economics, is it possible to allocate joint costs other than on an arbitrary basis? [...] THE DEPONENT: It is. I mean, it’s possible. And I think to put it in proportion to revenue is -- is very common. It is -- it is difficult sometimes because you could allocate the cost in a -- a different way. Q. [...] Well, as a matter of economics, is there any way to allo- -- any way to allocate joint costs that is not arbitrary? [...] THE DEPONENT: I think it may depend on a particular market and whether you could figure out, if they’re operated separately, what sort of costs would be borne. Here, I think none of that affects the marginal cost measure. But I do assume for the alternative occurring fixed cost measure that it is proportionate to revenue.”).

way to allocate them to individual operating segments that is not completely arbitrary.^{143,144} Consistent with this reality and using the Management Approach to prepare its audited financial statements, Apple segments its business by geography rather than product line, and does not allocate research and development and other joint costs to geographic segments.¹⁴⁵

98. Trial testimony of Epic’s CEO Tim Sweeney illustrates that research and development expenditures are a joint cost. Mr. Sweeney acknowledged that Epic’s *Fortnite* game could not have been played on the earliest versions of the iPhone, and that Apple had to make improvements to the iPhone hardware before games like *Fortnite* could reach iOS customers via the App Store.¹⁴⁶ Since Apple’s research and development expenditures

¹⁴³ Joint costs are costs that are incurred across multiple products rather than separate ones. An example would be a farm’s total tractor hours, which would be divided between crop and livestock operations. See Demski, Joel S., *Managerial Uses of Accounting Information*, Springer, 1997, at p. 169 (“Joint costs arise when an organization produces multiple products and its cost function is not fully separable. Some costs, then, ‘jointly’ produce the products.”); “Commodity Costs and Returns Estimation Handbook,” *United States Department of Agriculture*, February 1, 2000, at p. 9-1 (“Joint production costs have been defined in the economic literature as costs that ‘are incurred on groups of products rather than on individual and separate ones.’ [...] [For example,] the total number of tractor hours is divided between crop and livestock operations.”). See also Baumol, William J., “Predation and the Logic of the Average Variable Cost Test,” *The Journal of Law & Economics*, 39(1), 1996, pp. 49-72, at p. 59 (“[I]n the case of a multiproduct firm [average total cost] violates all economic logic. Outside a textbook, there probably exists no such thing as a single-product firm, and all multiproduct firms have fixed costs incurred in common on behalf of two or more of their products. There is, however, no economically defensible way of dividing such costs up among the firm’s various products. As is well known, all methods for the allocation of common fixed costs are arbitrary.”). See also Malackowski Class Report, at ¶ 252.

¹⁴⁴ Professor McFadden asserts to the contrary that joint costs *can* be allocated. See McFadden Deposition, 107:16-108:1 (“Q. [...] And -- and what nonarbitrary way or ways are there for an economist to allocate joint costs? A. An economist would typically look at the total cost as -- as a function of the level of activity in the various types of activity. And by regression analysis, or in some form, provide a -- an allocation of those -- of that joint cost to the individual activities. You -- it’s effectively a way of -- of determining the marginal effect of each activity on the joint cost.”). He imagines a situation in which a joint cost contributes to the production of two products, and the ratio of the outputs of those products varies over time. Then, as he says, regression or related techniques could be used to estimate the (average) marginal contributions of the joint cost to production of each product within the range of the data. Such a procedure would yield only marginal contributions and, more importantly, bears no relation to formulaic accounting methods, such as allocating on the basis of revenue shares.

¹⁴⁵ Malackowski Class Report, at ¶¶ 241, 251.

¹⁴⁶ Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 3, 2021, at 144:16-145:2 (“THE COURT: Okay. So in 2007 or 2008 was Fortnite, the technology required to play Fortnite, could that have been played on an iPhone? THE WITNESS: No, Your Honor. In that time frame the iPhone was not powerful enough to play a game as graphically elaborate as Fortnite. THE COURT: [...] Apple did have to do something to the iPhone itself; right, in terms of the technology of the iPhone in order for it to be sophisticated enough to play your software? THE WITNESS: Yes.”).

generally benefit the entire iOS platform via indirect network effects, allocating any fraction of such expenditures to the App Store would be an arbitrary and misleading exercise.

99. Apple’s CEO Tim Cook has testified that Apple does not attempt to allocate joint costs because doing so would be “totally unproductive”.¹⁴⁷ Apple has never attempted to assess the App Store’s profitability on a standalone basis.¹⁴⁸ Epic’s CEO Tim Sweeney similarly views any effort to attribute the cost of developing shared technology to a particular product use or service of Epic to be artificial and arbitrary,¹⁴⁹ and believes that any declaration of a precise profit margin for a specific product or service would be “fundamentally flawed.”¹⁵⁰ Thus any accounting measure of the App Store’s stand-alone profitability is also artificial and arbitrary and therefore unreliable as an indicator of anything. As a consequence, the opinions regarding market power put forth by Professors Elhauge, Economides, and McFadden are equally unreliable, as they rely on this fundamentally flawed measure of profitability.

¹⁴⁷ Trial Testimony of Timothy Cook, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 21, 2021, at 3875:19-3876:5 (“Q. And does Apple prepare fully burdened P&L statements for today’s business units -- A. No. Q. -- in the ordinary course of business? A. No. Q. Can you explain why not? A. Well, because, first of all, allocation of costs, of joint costs, are very difficult to do, and it’s open for debate about how to do it. [...] [I]t would be totally unproductive, in my mind.”).

¹⁴⁸ Trial Testimony of Timothy Cook, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 21, 2021, at 3876:18-20 (“Q. Has Apple ever attempted to determine the specific profitability of the App Store as a stand-alone business unit? A. No.”).

¹⁴⁹ Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 4, 2021, at 229:18-25 (“Q. And any effort to attribute the cost of developing shared technology to a particular product use or customer would be largely artificial, correct? A. Yes, that is my view of accounting at Epic. Q. And you also believe that any effort to attribute the cost of developing shared technology to a particular product use or service would be arbitrary, true? A. Yes, very much within Epic.”).

¹⁵⁰ Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 4, 2021, at 231:12-16 (“Q. Mr. Sweeney, if someone were to point at one product or service that your company offers and declare a precise profit margin for it, that assessment would be fundamentally flawed, wouldn’t it? A. Yes, within most parts of Epic, that’s correct.”).

2. *Implications for Assessing Structural Evidence*

100. Market share calculations can also provide insight regarding market power. Once a relevant market is defined as described in **Section IV.A**, and once a suitable measure of output is available, one can calculate the market shares of market participants. Often it is prudent to calculate market share using several metrics—such as the number of transactions or the dollar value of transactions—to provide a careful assessment of the structural evidence of market power. In the context of two-sided markets, both metrics have drawbacks.¹⁵¹
101. In using a firm’s market share to assess its market power, it is important to consider the durability, that is, its ability to persist for a significant period without being eroded by new entry or expansion.¹⁵² Barriers to entry and expansion in the platform business is low, and such success and failure can come quickly.¹⁵³ Emerging platforms that may not have a significant output share today, can still constrain the App Store because of the threat that they can leverage indirect network effects and grow rapidly.¹⁵⁴ On the other hand, when users on one side of a platform defect, the platform becomes less attractive to the other group of users, and a rapid downward spiral can ensue, as illustrated by the case of

¹⁵¹ Using the number of transactions has a number of drawbacks. First, some apps and in-app purchases are more valuable than others. Second, in-app purchases of digital content can be made in varying increments. Third, I understand that data on the number of transactions is not available for all market participants. Using the dollar value of transactions is not without drawbacks either, if many products sold through the platform are sold below marginal cost (or are free). This is the case of the App Store, where 84 percent of apps downloaded are free for consumers and produce no revenue for the App Store.

¹⁵² “Monopoly Power,” In *Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act*, Department of Justice, 2008, pp. 19-31, at p. 24.

¹⁵³ Evans, David S. and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, Harvard Business Review Press, 2016, at pp. 76-79 (“YouTube worked at pushing up video uploads and video views during its yearlong march to ignition. [...] It pushed participation by both sides simultaneously en route to critical mass.”) and p. 118 (“Both [Android and Apple] enjoyed explosive growth, driven significantly by the positive feedbacks between app developers and users.”).

¹⁵⁴ Cloud-based streaming services business models are still evolving. Some of these services, such as Google Stadia seem already to be transaction platforms and therefore belong in a relevant product market of digital game transactions, while Microsoft Xbox Cloud Gaming may be an emerging transaction platform. Other cloud-based streaming services that are not two-sided transaction platforms certainly also constrain the App Store’s ability to raise price.

Nintendo Wii¹⁵⁵ and Vine.¹⁵⁶ Furthermore, transactions facilitation mechanisms that are not in the relevant market may nonetheless constrain the market power of platforms in the market. Thus in platform businesses, market share may be a very unreliable indicator of durable market power.

102. Focusing on the two relevant markets defined by Professor Willig and Professor Hitt, I have seen no evidence to conclude that Apple has market power in either the market for digital game transactions or the market for TV/video transactions.¹⁵⁷ Moreover, Apple’s shares of transactions in these markets is likely to further erode as new platforms that facilitate digital transactions enter, since barriers to entry and expansion are low.¹⁵⁸ In each of the relevant markets, there are also multiple channels in which developers can distribute their apps to

¹⁵⁵ The Nintendo Wii was launched in 2006 along with the Wii Shop Channel, an online platform that allowed users to purchase and download Nintendo Wii content. By 2008, sales of Nintendo’s Wii represented 55 percent of all sales between the Wii, PlayStation, and Xbox. However, by 2014 Nintendo’s revenue had fallen by more than 60 percent, and the Wii Shop Channel was discontinued in 2019. *See*, Svensson, Peter, “Nintendo’s Wii launch goes smoothly,” *NBC News*, November 19, 2006, available at <https://www.nbcnews.com/id/wbna15802977>. *See also* “Nintendo Support: Wii Shop Channel Discontinuation,” *Nintendo*, available at https://en-americas-support.nintendo.com/app/answers/detail/a_id/27560/~wii-shop-channel-discontinuation, accessed on January 30, 2021 (“The Wii Shop Channel, which has been available on Wii systems since December 2006”); Taven, Miles, “2010 Year on Year Sales and Market Share Update to September 25th - News,” *VGChartz*, October 2, 2010, available at <https://www.vgchartz.com/article/82283/2010-year-on-year-sales-and-market-share-update-to-september-25th/>; Sun, Leo, “3 Reasons the Nintendo Wii Failed,” *The Motley Fool*, October 30, 2013, available at <https://www.fool.com/investing/general/2013/10/30/3-reasons-the-nintendo-wii-failed.aspx>; “Nintendo Support: Wii Shop Channel Discontinuation,” *Nintendo*, available at https://en-americas-support.nintendo.com/app/answers/detail/a_id/27560/~wii-shop-channel-discontinuation.

¹⁵⁶ Vine rose to success rapidly as a short-form video sharing platform that reached 200 million monthly active users in 2015 and was considered a leader among social video apps. It was shut down at the beginning of 2017. *See*, Smith, Craig, “30 Vine Statistics and Facts,” *DMR*, July 1, 2020, available at <https://expandedramblings.com/index.php/vine-statistics/>; Newton, Casey, “Why Vine Died,” *The Verge*, October 28, 2016, available at <https://www.theverge.com/2016/10/28/13456208/why-vine-died-twitter-shutdown> (“Vine once boasted a commanding lead over other social video apps”); Huddleston, Tom, “Twitter Is Officially Shutting Down Vine Today,” *Fortune*, January 17, 2017, available at <https://fortune.com/2017/01/17/twitter-shut-down-vine-tuesday/>.

¹⁵⁷ Willig Report, at Section VII.A.1 (“Digital game transactions comprise a distinct relevant app transaction market”) and Section VII.A.2 (“TV and video streaming app transactions comprise a distinct relevant app transaction market”). Apple’s share of the digital game transaction market is between 23.3 percent and 37.5 percent. *See* Hitt Written Direct Testimony, at ¶ 127. Hitt Class Report, Section 7.2.1; Hitt Class Report, Section 7.2.2.

¹⁵⁸ Hitt Rebuttal Report, at ¶¶ 58, 252 (“Since the launch of the App Store, several new game transaction platforms that compete with the App Store have entered the market, which is consistent with low barriers to entry in this market.”); Hitt Class Report, Market Definition Appendix, at Section 2.

consumers aside from the App Store.¹⁵⁹ In addition, app developers located outside the U.S., who are not asserted class or the relevant market, can switch their development and marketing efforts away from U.S. consumers toward consumers in other geographies, reducing the attractiveness of U.S. platforms to U.S. consumers and constraining the App Store’s market power. Finally, the majority of consumers and developers multi-home across multiple transaction platforms.¹⁶⁰

103. Of course, even if this conclusion is accepted, it does not follow that there is no relevant market for app transactions in which Apple has market power. On the other hand, even if this conclusion is rejected, it does not follow that Apple has market power in *any* other relevant market for app transactions. There is sufficient heterogeneity on multiple dimensions among different types of apps, as discussed above, including heterogeneity in business models and in the identity and importance of competitive platforms, to demonstrate that not only is an all-app market untenable, but also that detailed analysis of any smaller proposed relevant market is required before its definition can properly be accepted. And, even if it can be shown that a proposed relevant market is properly defined, additional analysis is required before an allegation of market power in that market can be accepted or rejected. Simply put, the evidence regarding Apple’s market power is not common across all app transactions and requires individualized inquiry. By basing their analyses on the assumption that all app transactions are in a single relevant market, plaintiffs are willfully ignoring enormous, highly relevant and highly visible complexity.

3. *Implications for Assessing Aftermarket Claims*

104. Plaintiffs’ experts allege that the App Store is an aftermarket because competition in the OS+device market cannot constrain Apple’s alleged monopoly power in the aftermarket for iOS app distribution, and switching costs effectively lock consumers into their initial choice

¹⁵⁹ Hitt Class Report, at ¶¶ 253, 262.

¹⁶⁰ Hitt Rebuttal Report, at ¶¶ 273-278 (“I showed that consumers typically have access to and use multiple types of devices. For example, I showed that most consumers have multiple platforms upon which to play games [...] many consumers multi-home across devices and make game transactions across devices [...] developers can, and do, multi-home across devices and digital transaction platforms”); Hitt Class Report, Market Definition Appendix, at Section 2.2.

in the foremarket.¹⁶¹ Since the App Store is a two-sided transaction platform, both sides must be considered in order to evaluate that allegation.

105. On the consumer side, one needs to take into account ownership of multiple devices on which apps can be used. Even if, hypothetically, a consumer who purchased an iPhone were to become locked in to using only iOS phones for the foreseeable future, there are apps that can be used on multiple devices.¹⁶² Even if exactly the same app is unavailable on, Windows or the macOS, close substitutes often are. For example, Sky Guide, a stargazing app, is available only on iOS, but alternatives like Stellarium are available on Windows and macOS.¹⁶³ For example, many consumers have access to multiple devices and could acquire games and game-related digital content on other platforms—and, in many cases, enjoy the content purchased on these other platforms even on their iOS devices.
106. Also, past experience indicates that it is easy to wrongly infer that switching costs are high just because relatively little switching has recently occurred. As noted above, when the iPhone was launched in June 2007, there were a number of established smartphone vendors, notably including Nokia and Rim (Blackberry). The first commercial Android phone appeared just over a year later, in September, 2008.¹⁶⁴ Yet by 2013, iOS and Android operating systems together accounted for 94 percent of global smartphone sales.¹⁶⁵ Millions of users had in fact switched from other smartphone operating systems to smartphones running on Android or iOS.

¹⁶¹ Elhauge Report, at ¶¶ 228-231; McFadden Report, at ¶¶ 98-101.

¹⁶² See, e.g., Deposition of Tim Sweeney, February 8, 2021 (“Sweeney Deposition”), at 42:17-42:21 (“The unique -- well, a major attraction of Fortnite is that players can play the game with their friends so long as their friend owns any number of one of a set of supported devices, console, mobile, PC.”) and at 43:14-43:17 (“I believe a fraction of the Fortnite audience, which is below 50 percent but still significant, has played Fortnite on more than one device.”); Hitt Class Report, Market Definition Appendix, at ¶ 72.

¹⁶³ “Sky Guide,” *AlternativeTo*, available at <https://alternativeto.net/software/sky-guide/about/>, accessed on August 7, 2021; “Sky Guide Alternatives,” *AlternativeTo*, available at <https://alternativeto.net/software/sky-guide/>, accessed on August 7, 2021.

¹⁶⁴ “T-Mobile Officially Announces the G1 Android Phone,” *TechCrunch*, September 23, 2008, available at <https://techcrunch.com/2008/09/23/t-mobile-officially-announces-the-g1-android-phone/>.

¹⁶⁵ “2013 Handset and Smartphone Sales and Market Share: 10 Things You Need to Know (Update),” *mobiForge*, April 1, 2014, available at <https://mobiforge.com/news-comment/2013-handset-and-smartphone-sales-and-market-share-10-things-you-need-to-know-update>.

107. On the developer side, many developers that use the App Store also develop for other platforms and reach consumers through other online platforms. If Apple were to raise prices to developers to monopolistic levels or to decrease developer support substantially, developers could switch their efforts away from work on iOS, since they can reach potential customers through other platforms. If developers were to do this, the attractiveness of the App Store to consumers would be decreased; they would acquire digital content elsewhere. And while consumers may face switching costs, those costs are not unbounded. If Android phones became more attractive to consumers and better apps were available on that platform, some users that had used iPhones would make an Android device their next phone.
108. Professor McFadden claims that iOS users face substantial switching costs and are unlikely to switch to a non-iOS device. Professor McFadden lists a number of contributors to the costs of switching, such as (1) the high price of hardware, (2) the cost of re-purchasing apps on non-iOS devices, (3) the difficulty of transferring data from iOS to non-iOS devices, (4) ecosystem integration.¹⁶⁶ The surveys conducted by Professor Simonson indicate that many consumers are not affected by the switching costs that Plaintiffs’ experts have claimed. Professor Simonson’s findings indicate that, among iPhone users who did not consider switching to an Android phone at the time of their most recent purchase of a new phone, only 10 percent said they did not consider switching because of other Apple products and less than 6 percent said they did not consider switching because of pairing/syncing with other Apple products.¹⁶⁷ In addition, fewer than 3 percent of those who did not consider switching said they did not consider switching because of the cost/burden associated with data transfer.¹⁶⁸ The survey results suggest that the switching costs due to forgoing other Apple products or transferring data are not the main reasons why most iPhone users do not switch.
109. Professor Simonson’s survey results indicate that the main reason why iPhone users do not switch to an Android phone is not because of high switching costs, but rather because

¹⁶⁶ McFadden Report, at ¶¶ 67-74.

¹⁶⁷ Simonson Report, at Exhibit 76.

¹⁶⁸ Simonson Report, at Exhibit 76.

iPhone users generally view iPhone device as a better product than an Android phone. In particular, Professor Simonson found that half of the iPhone users did not switch to an Android phone because of overall quality.¹⁶⁹ Features and ease of use are also the third and fourth main reasons why iPhone users did not switch to an Android phone.¹⁷⁰ Being reluctant to switch because I prefer the product I use to available substitutes is hardly a signal of a competitive problem. The development of unique features and functions that will make consumers reluctant to switch is a central focus of competition in technology-intensive products; the unwillingness to switch due to reasons above are a symptom of competition, not a sign of its absence.

110. Furthermore, the survey results suggests that there is meaningful switching from iOS devices to Android phones, contrary to what Plaintiffs’ experts have claimed. Among iPhone users who considered switching, 12 percent switched to an Android phone as their primary or only smartphone.¹⁷¹ Among iPad users who considered switching, 31 percent switched to an Android tablet.¹⁷² Furthermore, 24 percent of iPhone users and 36 percent of iPad users who considered switching listed price/cost as the main reason why they considered switching.¹⁷³ While some of them did not switch, it is likely that an even larger share of iPhone and iPad users would switch if Apple raised the prices of its devices, and this effect would be amplified by indirect network effects. The initial switching reduces the number of users in the App Store, which also reduces the number of developers in the App Store. This in turns induces additional switching of iOS users because the App Store has

¹⁶⁹ Simonson Report, at Exhibit 76.

¹⁷⁰ Simonson Report, at Exhibit 76.

¹⁷¹ Simonson Report, at Exhibit 74 (13/105=12%).

¹⁷² Simonson Report, at Exhibit 79 (8/26=31%).

¹⁷³ Simonson Report, at Exhibit 75 and Exhibit 80.

become less desirable. These switching patterns indicate that competition among iOS and non-iOS devices is robust, contrary to what the Plaintiffs’ experts have claimed.^{174,175,176}

111. Even if some iOS developers and consumers have non-trivial switching costs, it does not follow that an aftermarket exists that gives the App Store durable market power. In the medium to long run, the extraordinarily innovative industry that produces mobile apps means that the needs of developers and consumers are constantly evolving. Apple will need to continue to innovate to remain competitive. Failure to meet the evolving needs of developers could have drastic consequences. Some iOS developers, for example, have threatened to leave the App Store when they request services from the App Store.¹⁷⁷

¹⁷⁴ It is worth mentioning that the process of moving data between iOS and Android devices can be automated. For instance, the Apple app “Move to iOS” is available on the Google Play store and is designed to facilitate Android-to-iOS switches. Samsung’s Smart Switch facilitates switching from an iOS device to a Samsung (Android) device. See “Transfer content from an iOS device with Samsung Smart Switch,” *Samsung*, available at <https://www.samsung.com/us/support/answer/ANS00061001/>, accessed on August 7, 2021. See also Trial Testimony of Philip Schiller, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 17, 2021, at 2848:22-2849:10 (“Q. And have OEM’s, original equipment manufacturers, developed any tools to assist those who wish to switch from IOS to an Android operating system device? A. Yes, they have. Q. And just -- just generally speaking, how do -- first of all, are you familiar in general with how those devices work? A. Yes. Q. And can you describe that, please. A. The -- the company that makes the device, Apple, Samsung, Google, and others, many of us create tools to help users switch to our devices. So Apple will create tools to help users switch from Android and ease that process to iOS. And companies like Google and Samsung and others have made tools to help users switch from iPhone to their devices.”).

¹⁷⁵ Professor Elhauge also analyzes iOS app distribution as an aftermarket in the alternative, for which he claims that competition in the device market could not prevent Apple’s monopoly power in the aftermarket for iOS app and IAP distribution services. See Elhauge Report, Section II.E.

¹⁷⁶ McFadden Report, at ¶ 44 (“In the primary market, consumers choose OS installed mobile devices such as iOS mobile devices or Android mobile devices.”) and footnote 58 (“I do not perform a rigorous market definition analysis on the primary market because Apple’s alleged anticompetitive conduct in this case relates only to the aftermarket.”); Elhauge Report, at ¶ 219 (“Competition has not been robust in the foremarkets for smartphones and tablets because Apple has had strong market power in those device markets.”).

¹⁷⁷ Deposition of Phillip Shoemaker, Vol.2, January 14, 2021 (“Shoemaker Deposition, Vol.2”), at 551:22-552:2 (“But -- but my concern was if we didn’t improve the app review process, developers might start pulling out and then making their games or their apps only available on the -- the Android store. It was just a -- to me, it was always -- you know, it was always the concern.”) and 555:2-13 (“Q. Okay. And speaking of it being heated, I note that on the bottom of this e-mail on page there he concludes by saying: ‘If Apple keeps treating developers that way, all of the small and medium developers will run away to other platforms. The developers are the future of Apple.’ Is this a complaint that you heard -- or a threat, I should say, that you heard from other developers? A. Yes. We -- we -- I had heard this threat before.”).

C. Implications for Establishing Antitrust Injury to Individual Class Members

112. The App Store is a two-sided transaction platform. As such, both developers and consumers are inextricably linked because the App Store provides transactions. This has implications for establishing antitrust injury to individual developer and consumer class members.
113. The competitive effects of actions by or policies of a transaction platform such as the App Store must be analyzed by considering impacts on the market as a whole, on the price and volume of transactions—the platform’s product. Consistent with this, analyzing antitrust harm to individual class members requires understanding how all prices and output in the but-for world would have evolved absent the at-issue conduct. The *Amex* court recognized this clearly.¹⁷⁸ *Amex* requires that net harm be demonstrated across the two interrelated sets of users, taking into account any efficiencies or benefits enjoyed by them.¹⁷⁹ As in the case of *Amex*, the App Store exhibits strong indirect network effects and provides services to both groups it serves simultaneously. It not only makes no economic sense to consider a single side in isolation, it makes no sense simply to assume that all members of either side will be similarly affected by policy differences between the actual and but-for worlds.
114. And, of course, what must logically matter is the net impact on individual developers and consumers of *all* the changes between actual and but-for worlds on *all* relevant transactions. Some developers might pay lower commissions but face more intense competition or higher overall costs, for instance. Similarly, some consumers might pay lower prices for some apps but higher prices for others. In both cases, for the purposes of class certification, the movement from the but-for world to the actual world must be harmful on net to each individual member of the putative classes.

¹⁷⁸ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 15 (“Accordingly, we will analyze the two-sided market for credit-card transactions as a whole to determine whether the plaintiffs have shown that Amex’s antisteering provisions have anticompetitive effects.”).

¹⁷⁹ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at pp. 15-16 (“[T]he competitive effects of a restraint on transactions cannot be judged by looking at merchants alone. Evidence of a price increase on one side of a two-sided transaction platform cannot by itself demonstrate an anticompetitive exercise of market power. [...] On the other side of the market, Amex uses its higher merchant fees to offer its cardholders a more robust rewards program[...]. That Amex allocates prices between merchants and cardholders differently from Visa and MasterCard is simply not evidence that it wields market power to achieve anticompetitive ends.”).

115. In his report, Professor McFadden erroneously claims that consumer class members “would be ‘uninjured’ only if all they purchased are those [apps] for which the But-For price is higher than the As-Is price.”¹⁸⁰ Following this flawed logic, he estimates that only 5.8% of consumer class members fell into this category.¹⁸¹ In his deposition, Professor McFadden admitted his mistake but could not quantify how many consumer class members are not injured based on all their transactions in his but-for world; he agreed that the number would be certainly higher than the 5.8% stated in his report.¹⁸²
116. Professor Elhauge seems fundamentally to misunderstand the implications of the teachings of *Amex* regarding net harm as it applies to class certification. Professor Elhauge claims that “[t]he conclusion about whether Apple’s challenged conduct on [sic] was anticompetitive, after accounting the effects on both sides of the market, [...] is the same for each and every developer (and each and every consumer) regardless of whether only some developers or some consumers were harmed.”¹⁸³ However, at the class certification stage, my understanding is that the relevant question is whether plaintiffs can show with common evidence that all or substantially all class members were harmed by the at-issue conduct. To ascertain this, one must evaluate the net impact on each individual developer and consumer in the respective classes of *all* the changes between actual and but-for worlds on *all* relevant transactions.

¹⁸⁰ McFadden Report, at ¶ 241.

¹⁸¹ McFadden Report, at ¶ 241.

¹⁸² McFadden Deposition, at 208:10-210:5 (“Q. And in paragraph 241, you say -- you estimate that ‘approximately 5.8 percent of the Consumer Class members spent money on only those apps and in-app content items whose But-For prices are higher at the 12 percent But-For commission rate.’ That does not indicate that you carried out a net impact analysis, does it? [...] Yes, by that calculation, there could be consumers for whom the net -- who have a net gain rather than a net loss. Q. (By Mr. Swanson) And have you estimated what approximate percentage of the consumer class members, based on a netting methodology, would have been uninjured? A. I don’t -- I believe that has been estimated, and my -- my recollection is that that number is -- is, in fact, small also. But I don’t recall this specific calculation. I -- I do believe that when I compute damages, I -- I do the netting entirely in the damage calculation. Q. But as you sit here, you don’t know how much higher than 5.8 percent the net-impact figure is? A. The answer is: No, I don’t recall it. No, I -- I don’t recall the -- the specifics of how these percentages were -- were calculated, so I would have to go back and look at the various calculations that were done.”).

¹⁸³ Elhauge Report, at ¶ 23 (“Put another way, the conclusion about the combined effect of the challenged conduct on both sides of the market does not depend on whether each individual Developer had an injured user customer, but instead on the sum of the effects of the conduct across all developers and all consumers.”).

1. Differences in Apple’s Complex Pricing Policies Between the Actual and But-For Worlds Must be Defined and Defended

117. The ultimate test of the competitive impact of challenged conduct is its effects on the total transaction price, taking into account charges to both sides. In a standard monopoly overcharge case, plaintiffs must establish that the price charged to individual class members in the but-for world would have been lower than in the actual world. In the context of two-sided platforms, it is insufficient to analyze whether a single at-issue component of the terms of the platform’s overall pricing policy is supra-competitive. Both developers and consumers are affected by the terms of the App Store’s overall monetization strategy at any point in time, whether or not the specific terms of that strategy apply directly to each side or not. Specifically, the level of the App Store’s headline 30% commission cannot be analyzed in a vacuum, as if it is the only pricing element that Apple can and would change in a but-for world. Rather, the commission is only a part of the App Store’s evolving pricing policies. As I discuss below, it is likely that in a but-for world, other elements of Apple’s multi-dimensional pricing policies would change while the 30 percent commission would not.
118. To evaluate harm, one must compare the effects of Apple’s monetization policies in the actual world to the monetization policies in the but-for world, taking into account the fact that in the but-for world Apple may have incentives to alter multiple terms of its monetization policy. This analysis must also consider that the App Store monetization policy varies by app type in the actual world, and may further diverge in the but-for world. In the actual world, for instance, the App Store does not charge a commission on purchases of beverages on the Starbucks app or car rides on the Lyft app, while it does charge a commission on purchases of V-bucks on *Fortnite*.¹⁸⁴ The App Store also waives the \$99 annual membership fee for certain non-profit organizations, educational institutions, and government entities, but not if the organization distributes paid apps or apps with in-app

¹⁸⁴ “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021 (“3.1.3(e) Goods and Services Outside of the App: If your app enables people to purchase physical goods or services that will be consumed outside of the app, you must use purchase methods other than in-app purchase to collect those payments, such as Apple Pay or traditional credit card entry.”).

purchases through the App Store.¹⁸⁵ Therefore, it is simply unrealistic to assume, as plaintiffs’ experts do, that the but-for monetization strategy would be uniform across class members or that its non-uniformity would mirror that in the actual world. As discussed further below, that assumption has led plaintiffs’ experts to unreliable conclusions.

119. Furthermore, one must take into account how the rise of alternative distribution channels, some two-sided and others single-sided, would impact Apple’s two-sided monetization policies in the but-for world. One would expect some developers and consumers to transact in other distribution channels for iOS apps instead of the App Store in the but-for world, and some developers may self-distribute (a single-sided alternative) in addition or exclusively. For example, EA has at times opted to distribute content exclusively through its self-distribution platform Origin, while Grand Theft Auto V can be purchased for the PC on Steam, Amazon, and on the developer’s own website (Rockstar Warehouse).¹⁸⁶ In a survey of Mac developers conducted in 2020, 24 percent responded that they distribute exclusively through the Mac App Store, 33 percent responded that they distribute exclusively outside the Mac App Store, and 43 percent responded that they distribute through both.¹⁸⁷ One must also consider that the decisions of developers and consumers to transact in different platforms may vary by app type and other characteristics.

2. *Output in the But-for World*

120. Second, to establish anticompetitive harm, plaintiffs must demonstrate that the App Store’s overall monetization strategy reduced output relative to that in the but-for world. Analyzing

¹⁸⁵ “Apple Developer Program Membership Fee Waivers,” *Apple*, available at <https://developer.apple.com/support/membership-fee-waiver/>, accessed on July 13, 2021 (“You can request to have the annual Apple Developer Program membership fee waived if you’re a nonprofit organization, accredited educational institution, or government entity that will distribute only free apps on the App Store and is based in an eligible region. [...] Fee waivers are not available for: Organizations distributing paid apps or apps with in-app purchase on the App Store.”).

¹⁸⁶ Orland, Kyle, “So long, Origin? EA comes back to Steam with new games,” *ArsTechnica*, October 29, 2019, available at <https://arstechnica.com/gaming/2019/10/so-long-origin-ea-comes-back-to-steam-with-new-games/>; “Amazon.com: Grand Theft Auto V Pc: Video Games,” *Amazon*, available at <https://www.amazon.com/Grand-Theft-Auto-V-PC/dp/B08WKQ56N5?th=1>, accessed on July 30, 2021; “Grand Theft Auto V: Premium Edition on Steam,” *Valve*, available at https://store.steampowered.com/bundle/5699/Grand_Theft_Auto_V_Premium_Edition/, accessed on July 21, 2021.

¹⁸⁷ “Setapp Mac Developer Survey 2020,” *Setapp*, available at <https://cdn.setapp.com/blog/images/Setapp-Mac-Developers-Survey-2020.pdf>, accessed on July 21, 2021, at p. 9.

both prices and output is crucial to understand the extent to which the alleged conduct might have decreased welfare for platform participants. For example, if a lower price in the but-for world is paired with a lower but-for world output, some platform participants may be worse off in the but-for world than they are in the actual world.

121. It is worthwhile to note that both Professor Elhauge and Professor Economides testified in their depositions that, in their view, in response to lower commissions they did not expect developers to lower consumer prices.¹⁸⁸ Moreover, Professor Economides explicitly stated in his deposition that he did not think that output would be higher in the but-for world.¹⁸⁹ If Apple’s conduct did not reduce output compared to the but-for world, my understanding is that it cannot be deemed anticompetitive.

¹⁸⁸ Elhauge Deposition, at 248:17-249:21 (“Q. [...] Well, I mean, I understand your opinion on impact. But I’d like to test that by understanding whether you have an opinion on what percentage of app transactions, whether paid downloads or in-app purchases, would have been at a lower price in the but-for world. [...] A.[...] I would say very few class members would pass on some of this, given the combination of percentage-based commissions, low marginal costs and these pricing tiers. I have not quantified just how few. I’m not even sure there are any.”); Economides Deposition, at 238:15-240:10 (“Q. [...] In paragraph 63 of your report, you state that your measure of damage is conservative because it does not include any additional profit that might have accrued if there were additional sales in the but-for world. Do you see that? A. Yes. Q. Are you saying that your measure is conservative because an accurate measure of developers’ lost profits would yield even more damages in every case? [...] THE DEPONENT: I’m not saying that at all. I mean, I’m saying I have a conservative calculation of -- of damages. Now, is it possible that someone in the but-for world would cut price, it’s possible. It’s also possible that someone would increase price in the but-for world. But the idea that I can predict that he’s going to, let’s say, cut price and be successful in selling more, if he would find more people to sell more. That’s hard to actually believe. Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it’s zero, or if it’s small, the -- there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world. So taking it one step further, the only possibility that somebody might have to -- to say, oh, you know, I’m going to cut the price a lot, would be if he had a huge marginal cost, which I think is unlikely. And unlikely, very, very very, very unlikely that -- that would be the case. And, again, even in that case, the -- you need some kind of guarantee that you would be able to sell more, which we don’t know. Finally, if the 99 cents rule remains in the but-for world, it would be very hard for any developer to cut the price to fit exactly in the next 99 segment. Let’s say, from -- from 2.99 to 1.99. It would be very hard to -- to do that. And, therefore, it would be an impediment to changing prices.”).

¹⁸⁹ Economides Deposition, at 245:15-246:13 (“Q. (By Mr. Swanson) Professor, is it your opinion that output in the but-for world will be higher in the relevant market than in the actual world? A. Let me try to answer that. Whether that is the case will depend on whether a particular developer has a high marginal cost and is able to cut price and can sell more and has a guarantee that he would sell more and that the price cut that he does fit the 99 cent tiers. So these are three different conditions which, in my opinion, are unlikely to be met. Q. Okay. A. Therefore, most likely, we are going to be with the same quantity in the but-for world as now. Q. And that’s true at the level of the market? A. I’m sorry? Q. Is that your opinion at the level of the market? [...] THE DEPONENT: That’s correct. And individually as well.”).

122. One may need to consider multiple metrics in evaluating competitive effects. When it is difficult to summarize a complex pricing strategy, the volume of transactions can be considered instead. In the case of payment cards, where the price of transactions rises with transaction value, the dollar amount of purchases and sales is a reasonable proxy for transaction volume. In the case of the App Store, analyses using total revenue only capture a subset of transactions because most transactions that occurred in the App Store are free for both consumers and developers. The number of transactions can be measured by the number of downloads, including both free and paid apps. Other metrics, such as number of developers for games and for apps in general and average commission rate paid per download can also help evaluate competitive effects. These analyses can be done collectively or separately, by different monetization strategies that are offered to the developers. These metrics can be used to assess whether output in the App Store has been constrained by its pricing policy. The analyses put forth by Professor Hitt use a reasonable methodology that accounts for the two-sided transaction pricing, and they show rapid output growth with no evidence of constraints from the App Store’s pricing policies.¹⁹⁰
123. All three of plaintiffs’ economic experts ignore the voluminous evidence indicating that the effect of Apple’s policies has been to produce a healthy, thriving ecosystem that has brought enormous benefits to developers and consumers and yielded Apple a return on its investments in intellectual property. As noted above, the App Store’s commission rates were established in 2008 and have not increased since then. The number of apps in the App Store has grown from just 500 when the store launched in 2008 to 1.85 million in the first quarter of 2020,¹⁹¹ while the share of entirely free apps has risen from approximately 25 percent in 2008¹⁹² to around 80 percent at the end of the 2019 fiscal year.¹⁹³ The number of

¹⁹⁰ Hitt Rebuttal Report, at Section 4.3.2.

¹⁹¹ Lumb, David, “12 years of the App Store: democratizing software under Apple’s rigid rules,” *TechRadar*, July 15, 2020, available at <https://www.techradar.com/news/the-app-store-at-12-whats-changed-and-whats-still-to-come>.

¹⁹² Friedman, Lex, “The App Store turns five: A look back and forward,” *Macworld*, July 8, 2013, available at <https://www.macworld.com/article/221393/the-app-store-turns-five-a-look-back-and-forward.html> (“The App Store launched on July 10, 2008, with a whopping 552 apps on its virtual shelves; the most common prices were \$1 and \$10, and there were a mere 135 free apps.”).

¹⁹³ Hitt Written Direct Testimony, at ¶ 108.

App Store developers has increased from 125,000 in 2009 to around 1.1 million today,¹⁹⁴ and developers have collectively earned around \$200 billion in revenue since 2008.¹⁹⁵ As I describe in more detail in **Appendix D**, innovation by Apple has also fostered innovation by developers in multiple ways. It requires a special lens to look at the evolution of the iOS ecosystem since 2008 and see competitive problems.

124. It is worth noting in this context that Epic’s economic expert admitted that the App Store obtained critical mass (the scale at which indirect network effects drive growth) sometime between 2009 and 2010 and conceded that it did not have monopoly power before 2010.¹⁹⁶ Although I do not accept his conclusion that the App Store ever attained monopoly power, even if one accepts all his conclusions, it follows that the App Store could not have exercised monopoly power before 2010 *and* that the App Store benefitted from strong indirect network effects before it could have imposed antitrust injuries on any consumers or developers. Professor Elhauge, who seems to have been unaware of Dr. Evans’ testimony on this point until his deposition,¹⁹⁷ has made the much stronger (and even less plausible) claim that the App Store attained both critical mass and monopoly power almost

¹⁹⁴ “Apple’s App Store Downloads Top Two Billion,” *Apple*, September 28, 2009, available at <https://www.apple.com/newsroom/2009/09/28Apples-App-Store-Downloads-Top-Two-Billion/>; Deposition of Matthew Fischer, Vol.2, December 19, 2020 (“Fischer Deposition, Vol.2”), at 366:16-22 (“Q. [...] [W]ith regard to paid iOS developers, do you have a sense of how many of those there are currently worldwide? A: The most recent number I heard for that, I believe, was roughly [REDACTED]. Q: And again that would mean that these are developers who paid the \$99 fee to Apple, correct? A: That is correct.”).

¹⁹⁵ “Apple services entertain, inform, and connect the world in unprecedented year,” *Apple*, January 6, 2021, available at <https://www.apple.com/newsroom/2021/01/apple-services-entertain-inform-and-connect-the-world-in-unprecedented-year/>.

¹⁹⁶ Trial Testimony of David Evans, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 11, 2021, at 1417:2-8 (“Q. Now, your take, Dr. Evans, is that the App Store obtained critical mass sometime between 2009 and 2010, right? A. That sounds like the right -- that sounds like the right time period. Q. And that is before Apple obtained monopoly power, in your view, in 2010, correct? A. That is correct.”).

¹⁹⁷ Elhauge Deposition, at 152:9-12 (“Q. [...] Did you -- are you aware of Dr. Evans’ opinion that Apple did not have monopoly power at the inception of the App Store? A. I’m not aware of -- of that opinion.”).

immediately after it was launched in 2008 with 500 apps.^{198,199} This position also implies that in any plausible but-for world, the App Store would have been in a strong competitive position relative to any new distribution channel, regardless of when the channel emerged. This, in turn, makes it more likely that Apple would have retained the 30% headline commission rate in all plausible but-for worlds.

3. *Measuring Harm to Individual Class Members*

125. Third, to properly measure harm to individual class members, any analysis must account for differences between the monetization policies the App Store would most likely adopt in the but-for world and the policies it has adopted in the actual world, the likely characteristics and costs of alternative distribution channels that would be present in the but-for world, and the impact of these differences on developers’ strategies, taking into account indirect network effects. In the context of two-sided platforms, the App Store’s altered monetization policies in the but-for world could have the potential to fundamentally alter the incentives for both developers and consumers. Specifically, this implies that both the price and quantities of transactions that would have occurred in the but-for world should be computed to measure harm (or lack of thereof) to developers and consumers.

¹⁹⁸ Elhauge Deposition, at 151:9-25 (“Q. [...] So have you reached any opinion about whether Apple has monopoly power in 2012? [...] THE DEPONENT: [...] [A]ll the evidence I’ve seen would indicate that its power went back to the inception of the iPhone [...] from the beginning it imposed exclusivity and had a 100 percent market share in that market from the evidence that I have seen.”) and 163:8-164:10 (“Q. [...] Do you have an opinion as to when the App Store -- Apple’s App Store attained critical mass? [...] I’d have to investigate, but my recollection was it was quite rapid, that the iPhone was out and there was very quickly lots and lots of apps on it and that there was no other real game in town at the time [...] Q. (By Mr. Swanson) Do you think Apple attained critical mass with 500 apps on the App Store? A. I think it was certainly enough at the time to be able to offer it. I mean, they -- they did offer it and the device was quite profitable from the get-go. So -- I mean, I think critical mass, not necessarily an abstract number that applies no matter what[.]”).

¹⁹⁹ Professor McFadden was also unaware of Dr. Evans’ testimony on this point until his deposition. *See* McFadden Deposition, at 94:9-13 (“Q. Are you aware that Dr. Evans testified to his opinion that Apple did not possess monopoly power through the App Store in the first couple of years of its existence? THE DEPONENT: I’m not aware of that.”). In his deposition, Professor McFadden declined to give definite dates on which the App Store attained critical mass or monopoly power, but he did state that it attained market power and exercised it as soon as the decision was made to make it the exclusive distributor of iOS apps, that is, on the day the App Store opened. *See* McFadden Deposition, at 95:13-96:3 (“Q. Do you have an opinion as to when the App Store attained critical mass? THE DEPONENT: Well, the presumption in your question is that -- is that there is some critical mass required for the App Store to -- to function or to acquire monopoly power. I -- I don’t think I agree with that presumption. The -- the market power associated with the Apple Store was it came from its ability to exclude rivals and function as the sole source of distribution of iOS App Store mobile -- mobile devices. So that -- I think that market power came into -- into existence and was exercised as soon -- as soon as Apple decided to make that distribution exclusive to them.”).

126. In addition, the nature and intensity of competition among developers must be considered. Some iOS apps clearly face intense competition from other iOS apps. **Exhibit 2** documents the results of a search in the App Store for “baby names,” which revealed that named plaintiff Cameron’s Lil’ Baby Names app seems to face direct competition from two other apps also priced at \$2.99, seven priced at \$1.99, another seven priced at \$0.99, and over 60 free apps. Similarly, **Exhibit 3** documents that a search for “Basketball Training” on the App Store returned more than fifty free apps, an app whose monthly subscription costs \$9.99, and three apps priced at \$0.99, \$ 2.99, and \$4.99, respectively.
127. Even those consumers who only use iOS devices have non-iOS competitive alternatives to Lil’ Baby Names. For example, there are at least ten websites that help with choosing baby names and as many books that are available to potential customers of the Lil’ Baby Names app.²⁰⁰ Similarly, there are numerous alternatives to Pure Sweat Basketball Workout available outside the App Store. For example, there are nine YouTube channels whose core content is centered on basketball training and as many websites that provide basketball workout programs.²⁰¹
128. The sheer number of iOS developers points to a business with very low barriers to entry and expansion. Epic Games, for instance, with over \$4 billion in revenue in 2019,²⁰² began in 1991 with founder Tim Sweeney selling games from his parents’ house.²⁰³ Intense competition and easy entry implies that most of any developer gains from lower commissions (or, indeed, any other changes) in the but-for world would be competed away and, in effect, what would have been lost profits in the absence of competition would become gains to consumers. The actual extent of pass-through will depend on the ease of

²⁰⁰ See **Exhibit 2**.

²⁰¹ See **Exhibit 3**.

²⁰² EPIC_00184615-628, at 623.

²⁰³ Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 3, 2021, at 89:18-19 (“Q. When did you found the Epic company? A. I started Epic Games in 1991.”); Sweeney Deposition, at 16:15-17:6 (“And in this first free episode of the game, I offered customers to buy the two sequels to it by sending a check to -- to my address -- well, my parents’ home address where I lived until 1998. [...] Q. Yes, yes. And in terms of actually distributing the purchased versions of your game ZZT, when someone sent you a check, what did you do? A I physically copied floppy disks at the time, and I -- I mailed them out to customers in the -- these protective mailers to prevent the disk from being bent, and they received the games through mail order domestically and internationally.”).

entry, the nature and intensity of competition and, generally, on the shapes of demand and cost functions.²⁰⁴

129. An additional complication when computing harm in two-sided platform cases requires the but-for world to be able to apportion the incidence of net harm to each side of the platform to avoid double-counting, accounting for any pass-through by developers who set the price of the apps they sell in the App Store. This task is particularly difficult in the presence of indirect network effects, which must be taken explicitly into account.
130. Moreover, in the context of retrospective harm cases such as this one, it is important to construct a but-for world that is true to the historical competitive conditions faced by consumers and developers, but for the alleged at issue conduct. To the extent that competitive conditions have evolved over time, a static but-for world based on today’s competitive conditions almost certainly would be misleading.

V. Plaintiffs’ Experts’ Assumed But-For Worlds Are Inconsistent With Apple’s Basic Competitive Strategy and the Historical Evidence

131. Plaintiffs’ experts generally assume that Apple’s pricing strategy in the but-for world would be identical to its strategy in the actual world, with the exception of lower commission rates for all developers. Professor Elhauge’s but-for world resembles the actual world with the exception of reduced commission rates, and his reasoning is circular: because it is so in the actual world, therefore it is so in the but-for world.²⁰⁵ He claims that Apple would maintain

²⁰⁴ Weyl, E. Glen and Michal Fabinger, “Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition,” *Journal of Political Economy*, 121(3), June 2013, pp. 528-583, at p. 531 (“[W]e consider a general model of symmetric imperfect competition in which firms set the elasticity adjusted Lerner index $[(p - mc)/p] \epsilon_D = \theta$, a conduct parameter. The conduct parameter is equal to one under monopoly, is equal to zero under perfect competition, and is typically greater than one when firms noncooperatively price complementary goods. The formula for pass-through similarly interpolates between the monopoly and competition formulas in the case in which θ is independent of market conditions, as is the case under both the Cournot competition and complements model and under the (quasi-linear version of the) Dixit and Stiglitz (1977) model of monopolistic competition.”). In a comment to Weyl and Fabinger’s article, Miklós-Thal and Shaffer provide corrections to Weyl and Fabinger’s formulas but still show that pass-through depends on the nature of competition and shapes of demand and cost functions. See Miklós-Thal, Jeanine and Greg Shaffer, “Comment: Pass-Through as an Economic Tool: On Exogenous Competition, Social Incidence, and Price Discrimination,” *Journal of Political Economy*, 129(1), 2021, pp. 323-335, at p. 329 (pass-through is a function of θ , and as the authors note, “In the familiar case of Cournot competition, $\theta = 1/n$, where n is the number of firms.”).

²⁰⁵ Elhauge Report, at ¶ 348 (“Evidence and economic theory indicate that the most likely way for Apple to reduce its average commission in the but-for world would be to adjust its entire commission structure downward.”) and ¶ 351.

exactly two tiers of commissions and not negotiate special rates for certain developers. Professor Economides follows Professor Elhauge’s lead and also claims that Apple would maintain two tiers of commissions,²⁰⁶ but he goes further to claim that the ratio of the lower commission rate to the higher commission rate would stay at 1:2.²⁰⁷ Professor Economides considers the annual developer subscription fee, but he concludes that it would be unchanged.²⁰⁸ Professor McFadden also ignores all elements of Apple’s pricing strategy except for the commission rate, but unlike Professor Elhauge and Professor Economides, he assumes away any semblance of price tiers and considers only a single average commission rate. Professor McFadden also assumes that in the but-for world “Apple would not impose the pricing tier policies on app developers.”²⁰⁹

132. At the outset, Plaintiffs’ experts’ conceptions of the but-for world are not grounded in economic theory, despite there being a rich literature in economics describing the optimal pricing decision of a monopolistic platform as well as the effects of competition among two-sided transaction platforms.²¹⁰ Even if one assumes, as Plaintiffs’ experts do, that the iOS App Store is a monopolist in the actual world, a key component of the optimal pricing decision of a platform is that, when setting the price on one side (side A), the platform takes into account its effect on the change in participation on the other side of the platform (side B). In other words, the value that users on side B derive from the interaction with side A is a key component of the pricing decision on side A (and vice versa).²¹¹ The strength of the

²⁰⁶ Economides Report, at ¶ 57.

²⁰⁷ Economides Report, at ¶ 59.

²⁰⁸ Economides Report, at ¶ 70.

²⁰⁹ McFadden Report, at ¶ 162.

²¹⁰ For a review of this literature, see Jullien, Bruno, Alessandro Pavan, and Marc Rysman, “Two-sided Markets, Pricing, and Network Effects,” January 2021, Working Paper. Section 2 reviews the literature on platforms’ pricing decision under a monopolistic competition framework, Section 3 reviews the literature on competition among several platforms. *See also*, Caillaud, Bernard, and Bruno Jullien, “Competing cybermediaries,” *European Economic Review*, 45(4-6), 2001, pp. 797-808; Caillaud, Bernard, and Bruno Jullien, “Chicken & egg: competition among intermediation service providers,” *The RAND Journal of Economics*, 34(2), 2003, pp. 309-328; Armstrong, Mark, “Competition in two-sided markets,” *The RAND Journal of Economics*, 37(3), 2006, pp. 668-691; Rochet, Jean-Charles, and Jean Tirole, “Two-sided markets: a progress report,” *The RAND Journal of Economics*, 37(3), 2006, pp. 645-667; Weyl, E. Glen, “A Price Theory of Multi-Sided Platforms,” *American Economic Review*, 100(4), 2010, pp. 1642-1672.

²¹¹ *See* Jullien, Bruno, Alessandro Pavan, and Marc Rysman, “Two-sided Markets, Pricing, and Network Effects,” January 2021, Working Paper, at pp. 10-11.

indirect network effects determines, in part, the value of the interaction between these two sides, which likely varies substantially across app categories and consumers. In Plaintiffs’ experts’ but-for world competition from other transactions platforms may differentially impact indirect network effects by app category. As such, the platform pricing decision in the but-for world may change across app categories, especially if these categories attract different users’ groups with different preferences about the value of the interaction.

Plaintiffs’ experts’ ignore the widely recognized scholarship on the crucial determinants of the pricing decision in two-sided transaction platforms, and simply assume that the App Store would reduce its headline commission rate and not re-optimize all other components of its monetization strategy. Plaintiffs’ experts’ failure to base their but-for world on sound models rooted in academic scholarship renders their but-for world flawed and unreliable.²¹²

133. In this section I discuss why it is unlikely that Apple’s headline commission rate would change in the but-for world. Even if Apple altered its commission rates as Developer and Consumer Plaintiffs’ experts assume, it is implausible that it would leave all other elements of its monetization strategy unchanged, though, to be clear, it is difficult to predict what changes it would in fact make.

A. It Is Most Likely that in the But-for World the App Store’s Headline Commission Rate Would Be 30% and that Developers Would Use a Variety of Distribution Channels with a Variety of Costs

134. In the actual world, since well before the launch of the iPhone, Apple has always competed primarily on the basis of offering high-quality, differentiated products that are easy to

²¹² See Jullien, Bruno, Alessandro Pavan, and Marc Rysman, “Two-sided Markets, Pricing, and Network Effects,” January 2021, Working Paper, at Section 2.2.

use.²¹³ In its iOS business, it has stressed privacy and security as differentiating features.²¹⁴ It would be fundamentally inconsistent with Apple’s longstanding basic strategy for it to respond to the emergence of competition in the but-for world to compete only on price by simply reducing the App Store’s headline commission rate below 30%. When Apple’s CEO was asked in the Epic trial what Apple would do if other iOS app stores were available to developers and consumers, he didn’t respond that it would cut the App Store’s commission rates. He instead replied, “We’d have to differentiate in some way.”²¹⁵

135. The idea that the App Store would have lowered its headline commission rates upon the appearance of other app distribution channels in the but-for world is also inconsistent with the actual behavior of stores owned by the suppliers of Android, Windows, and the Mac OS operating systems. **Exhibit 4** shows that, until very recently, all had kept their headline commission rates at 30% despite the presence of competing transaction platforms on the

²¹³ Aljafari, Abdulla, “Apple Inc. Industry Analysis Business Policy and Strategy,” *International Journal of Scientific & Engineering Research*, 7(3), March 2016, pp. 406-441 (“Apple differentiates itself by providing both the hardware and software in all of their devices. They also try to keep their designs simple, easy to use, interconnected and aesthetically pleasing.”); Lendino, Jamie, “A Look Back at 30 Years of the Mac,” *PCMag*, January 24, 2014, available at <https://www.pcmag.com/news/a-look-back-at-30-years-of-the-mac> (“[S]hrewdly designed and smartly equipped [...] the Mac exuded simplicity and sophistication.”); “Why Society IS Still Obsessed With The iPhone,” *Medium.com*, February 26, 2018, available at <https://medium.com/bizcatalyst-360/why-society-is-still-obsessed-with-the-iphone-7a319557b4ef> (“[T]he iPhone is relatively easy to use. Arranging your apps, finding your apps, and protecting your phone is incredibly simple to use. Not only is it easy to use, it’s one of the fastest phones on the market.”); Costello, Sam, “History of the iPod: From the First iPod to the iPod Classic,” *Lifewire*, January 12, 2020, available at <https://www.lifewire.com/history-ipod-classic-original-2000732> (“While it was not the first MP3 player, the original iPod was both smaller and easier to use than many of its competitors.”).

²¹⁴ In the Epic trial, Epic CEO Tim Sweeney testified that the iPhone’s privacy and security are two reasons he believes the iPhone to be a superior product to Android phones. See Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 4, 2021, at 302:2-303:10 (“Q. Mr. Sweeney, you use an iPhone, correct? A. Yes. [...] Q. And you understand that user privacy and security are fundamental competitive differentiators for Apple, correct? A. Yes. Q. And you personally prefer to use iPhone because Apple’s approach to maintaining your privacy, Mr. Sweeney, is superior to Google’s, correct? A. That’s among the reasons. Q. And among the reasons that you use an iPhone is because Apple’s approach to customer data security is superior to Google’s as well, correct? A. Yes. Q. And when I say ‘Google,’ you understand I’m referring generally to the Android devices, correct? A. Yes. Q. And you value those qualities, the safeguarding of your privacy and your data, true? A. Yes.”).

²¹⁵ Trial Testimony of Timothy Cook, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 21, 2021, at 3934:23-3935:2 (“Q. If there were another app store or app stores available, Apple would have to actually compete and persuade users that it had the best offering, right? A. We’d have to differentiate in some way. I don’t know what we would do.”).

same operating systems. In addition, other stores handling apps for Windows, Android and MacOS had 30% headline rates for much of the relevant periods.

136. Moreover, the App Store’s 30 percent commission was established in 2008, before Apple was alleged in the Epic case to have gained monopoly power in 2010. As noted above, between 2008 and 2010, even accepting Epic’s allegations, the App Store attained critical mass without monopoly power while charging a 30 percent commission.²¹⁶ It is therefore hard to argue that Apple would not be able to obtain critical mass before 2010 and sustain a 30 percent commission thereafter in the but-for world. The indirect network effects that propelled the App Store to obtain critical mass in the actual world, without monopoly power, would very likely also benefit the App Store in the but-for world as well.
137. In the but-for world, in which there would be platforms that offer lower prices for paid apps and in-app purchases, it seems likely that an appreciable number of consumers would prefer the App Store to these alternatives. In his surveys, Professor Simonson finds an overwhelmingly 83 percent of respondents would prefer the App Store with superior privacy and malware protection, as well as more free apps, over an alternative store with lower prices.²¹⁷ This strongly suggests that the App Store would have incentives to keep the headline commission rate to be 30% and, continue to differentiate by offering better privacy and malware protection, and continue to work to attract free apps.²¹⁸ In fact, Professor Simonson’s survey suggests that, in a but-for world where there are lower-priced alternative app stores, a differentiated App Store would not be able to capture a significantly larger share of the market by lowering its commission rates.²¹⁹
138. Thus, in the most likely but-for world, the App Store’s headline commission rate would be 30%, and the headline commission rate in some alternative distribution channels would also

²¹⁶ Trial Testimony of David Evans, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 11, 2021, at 1417:2-8 (“Q. Now, your take, Dr. Evans, is that the App Store obtained critical mass sometime between 2009 and 2010, right? A. That sounds like the right -- that sounds like the right time period. Q. And that is before Apple obtained monopoly power, in your view, in 2010, correct? A. That is correct.”).

²¹⁷ Simonson Report, at Exhibit 12.

²¹⁸ For those respondents who selected the Apple App Store, Malware protection and Privacy were the most important features. Simonson Report, at Exhibit 15.

²¹⁹ Simonson Report, at Exhibit 23. Simonson Report, at ¶83.

likely be 30%, consistent with the historical trends of commission rates charged by other platforms. Nonetheless, as in the cases of Windows and the MacOS, other iOS app stores might well enter and, as Professor Elhauge argues, they would likely have varying commission rates in the but-for world due to vertical product differentiation and differences in business strategies.²²⁰ Some stores might elect to compete for developers with lower headline rates, but the historical record indicates that others would not.

139. Different developers in different categories are likely to make different choices. In a but-for world, developers would have the option of continuing to use the App Store, using direct distribution, or selling through alternative stores, including new stores that may launch. Small developers may find that the App Store continues to be the best channel for them. Large developers may be able to obtain special deals with other stores in exchange for exclusive distribution, or they may be able to use established reputations, plus advertising, to drive sufficient traffic to their websites to make direct distribution the most attractive. In the actual world, developers of Windows apps pay a range of commissions. Professor McFadden and Professor Economides assume that nonetheless, all developers in the iOS but-for world would pay the same commissions. Absent other changes in Apple’s pricing and other market developments, consumers and developers who chose to use the App Store exclusively would suffer no injury.
140. It may be the case that stores distributing a narrower set of apps may be better suited to enter than stores distributing a wider set of apps such as those currently available on the App Store, so different apps and different developers may face significantly different competitive alternatives in the but-for world. Yet even if differences in competitive alternatives may be identifiable, it is still challenging to predict how differences in pricing may evolve.

²²⁰ Elhauge Report, at ¶ 326 (“Vertical Product Differentiation in iOS App Distribution Market in the But-For World Would Have Caused Profit-Maximizing Commissions to Vary Across Firms.”). Professor Economides also asserts that different types of stores may enter, some focused on gaming, others general purpose, and that some developers may self-distribute. *See* Economides Report, at ¶¶ 35-36, which discusses the Windows PC app distribution market as a yardstick (“[F]rom a functional perspective the Windows PC app distribution market is similar to the iOS app distribution market. [...] There are a variety of distribution options, including (a) app stores offering 3rd party distribution: for example, the Steam Store, the Epic Games Store, and the Microsoft Store; (b) self-distribution platforms, such as Battle.net (Activision Blizzard) or Origin (EA); and (c) small-scale self-distribution solutions such as the Humble Widget”).

141. The case study of China, where Google Play does not operate and numerous Android app stores compete, shows that, at least for some app categories, commissions in a but-for world may not necessarily be lower even if the number of competitive alternatives is higher. A review of the commission rates charged by app stores active in China shows that these stores often charge commission rates of 30 percent or higher, and that commission rates vary across app genres. Commissions on gaming transactions are often 50 percent or higher: MyApp charges 55 percent for games;²²¹ Huawei AppGallery charges 50 percent for in-app gaming purchases and 30 percent for initial game downloads;²²² OPPO Software Store charges 52.5 percent for games;²²³ and MIUI App Store charges 50 percent for games.²²⁴ Commission rates for apps of other genres vary: Huawei AppGallery charges 20 percent for Education apps and 30 percent for other apps;²²⁵ Qihoo 360 offers a tiered structure based on revenue, which charges from 20 percent for monthly earnings below ¥100,000 up to 64 percent for monthly earnings above ¥5,000,000; and MM Store’s distribution agreement indicates that commission rates vary by the product, with most

²²¹ “Tencent Open Platform,” *Tencent*, available at <https://wiki.open.qq.com/wiki/%E5%90%88%E4%BD%9C%E6%96%B9%E5%BC%8F>, accessed on July 21, 2021. Note that 25 percent of revenue goes toward “Android channel cost” (“The fixed cost of Android channel cost is 25%, that is, 75% of the gross revenue is the total revenue of the revenue distribution.”). Of the remaining 75 percent of revenue, 60 percent goes to the developer. The resulting commission is $1 - 0.75 \times 0.60 = 55$ percent. This website was translated into English using Google Translate.

²²² “Huawei AppGallery Connect Distribution Service Agreement For Paid Apps,” *Huawei*, January 29, 2021, at pp. 3-5, available at https://terms1.hicloud.com/agreementservice/developer/getAgreementTemplate?agrType=1005&country=ove&language=en_us&version=2021013001.

²²³ “Game Access Process,” *OPPO*, available at <https://open.oppomobile.com/wiki/index?id=73452>, accessed on July 21, 2021 (“The income is divided into 5:5 after excluding the channel payment cost, and the channel payment cost rate is 5%.”). Note that the 5 percent of revenue goes toward the channel payment cost. Of the remaining 95 percent of revenue, 50 percent goes to the developer. The resulting commission is $1 - 0.95 \times 0.5 = 52.5$ percent. This website was translated into English using Google Translate.

²²⁴ Chen, Yanqu, “I Never Thought That Xiaomi Would Start To Grab Business With Tencent’s ‘Glory Of The King’,” *Jiemian*, July 25, 2017, available at <https://www.jiemian.com/article/1497121.html>. This website was translated into English using Google Translate.

²²⁵ “Huawei AppGallery Connect Distribution Service Agreement For Paid Apps,” *Huawei*, January 29, 2021, at pp. 3-5, available at https://terms1.hicloud.com/agreementservice/developer/getAgreementTemplate?agrType=1005&country=ove&language=en_us&version=2021013001.

charged 50 percent, and “special products” charged between 30 and 70 percent.²²⁶ Lastly, at least one store, Baidu, does not even allow for paid transactions on non-gaming apps.²²⁷

142. The assumption made by plaintiffs’ experts in calculating damages that all developers would pay the same commissions in the but-for world is thus a priori implausible, and it is also inconsistent with evidence from the actual world cited by Developer Plaintiffs’ expert Professor Economides. He cites distribution costs for Windows apps in the actual world ranging from 9% for self-distribution to 28%.²²⁸ The lower marginal costs that he shows for self-distribution seem attractive,²²⁹ but he admitted in his deposition that self-distribution would also involve fixed costs of [REDACTED], so that even a popular app with \$100 million in annual sales would incur a self-distribution cost of [REDACTED].²³⁰ Professor Economides describes HumbleBundle.com’s Humble Widget as a self-distribution solution for smaller developers, citing a distribution cost of approximately 10 percent.²³¹ However, he neglects to mention that Humble Bundle only makes payouts to developers once a minimum balance of \$250 is attained; for developers whose apps earn less than \$250, the effective distribution cost is 100 percent.²³² 45 percent of developers in the class had apps

²²⁶ “Channel Flow Alliance Cooperation,” *China Mobile Internet*, available at <https://dev.10086.cn/docInside?contentId=10000009834882>, accessed on August 7, 2021 (“Cooperative channel revenue = [total revenue-payment channel service fee-game right holder (CP) share] × cooperative channel share ratio (usually 50%, and some special products are between 30% and 70%)”). This website was translated into English using Google Translate.

²²⁷ “Help - Baidu Mobile Application Platform,” *Baidu*, available at <https://app.baidu.com/docs?id=5&frompos=401010>, accessed on July 22, 2021 (“Can software applications be connected to payment? No, only game developers can access for the time being”). This website was translated into English using Google Translate.

²²⁸ Economides Report, at ¶ 36 and Table 4.

²²⁹ Economides Report, at Table 4 and ¶ 29 (“Thus, a PC app developer has the option of self-distribution for a fee of about [REDACTED] of sales revenue, even when the developer is extremely small and/or has no particular expertise in online distribution.”) and ¶ 39 (“[G]enerally developers will pay less for self-distribution than the [REDACTED] average.”).

²³⁰ Economides Deposition, at 176:1-12 (“Q. Yeah. I’m just asking what you think this 100 -- or [REDACTED] applies to. Does it -- it apply to a developer with a \$100 million in annual iOS app revenues? A. I think it could apply, yes. Q. And -- and if it did, that developer to self-distribute through its own store would require -- incur a payment of [REDACTED] [REDACTED] of 100 million, which would be a total of [REDACTED] per year, correct? A. Yes.”).

²³¹ Economides Report, at ¶ 29.

²³² “Widget Developer FAQ,” *Humble Bundle*, available at <https://support.humblebundle.com/hc/en-us/articles/202742190-Widget-Developer-FAQ>, accessed on July 19, 2021 (“Q: When do I get paid? A: When

that never even hit \$100 in sales during the class period.²³³ In the actual world, when developers have the choice of alternative distribution methods, not all make the same choice, and not all pay the same cost. This would also happen in the but-for world, and individualized analysis would be required to estimate the differences. Plaintiffs’ experts implausibly assume this likely variation away and arbitrarily assume all developers pay the same commission costs for all apps.

B. It Is Most Unlikely that in the But-for World Apple Would Leave All Other App Store Policies, Apart from Commission Rates, Unchanged

143. In its iOS business, Apple has decided to earn profits directly from consumers (through the sale of devices) and, as compensation for the use of its intellectual property, from developers (through App Store commissions and other fees). In the but-for world, Apple’s ability to use App Store commissions to obtain compensation from developers would be reduced, as the App Store’s share of total iOS app transactions would almost surely decline. In this radically changed environment, Apple would naturally consider different approaches to obtaining compensation from developers, particularly developers who chose not to use the App Store exclusively.

144. **Exhibit 5** summarizes various elements of the App Store’s monetization strategy and contrasts them with the pricing policies of other two-sided transaction platforms, including both platforms operated by firms that own the OS, and those that do not. The variation in policies across platforms suggests that Apple has the flexibility to change numerous aspects of its pricing in the but-for world in which it would be forced to allow competitive distribution of iOS apps. In contrast, Plaintiffs assume that everything would be unchanged except for the commission rate. While plaintiffs’ experts do not explain why all remaining elements in the exhibit should remain unchanged in the but-for world, all these elements affect developers, consumers, and device sales. Because of indirect network effects, Apple’s pricing problem is complex, as changing one or more elements of its monetization policies has the potential to make the platform less appealing to both developers and

the minimum balance of \$250 is met, payments will take place within thirty (30) days after the end of each calendar month.”).

²³³ Hitt Class Report, Figure 10. Of the 67,934 developers in the proposed class, 12,651 had billings below \$10, and 17,872 had billings greater than or equal to \$10 and below \$100.

consumers, including the other ■ percent of developers that are not part of the developer class and ■ percent of consumers that are not part of the consumer class.²³⁴ Given that Apple is unlikely to change its headline rate in the but-for world, it is highly likely that Apple would at least consider changing some or all of the additional elements of its pricing policies. The following sub-sections describe certain elements, highlighted in the exhibit, that Apple may consider changing in the but-for world and what some of the consequences might be for consumers and developers.^{235,236} Apple could charge a fee for access to the Software Developer Kit and other tools included with Apple’s Developer Program or increasing the nominal annual access fee of \$99 to join the Apple Developer Program (or \$299 for its Enterprise Program)

145. In addition to making the SDK and other tools available for free and charging only a nominal access fee for distribution of apps on the App Store, as discussed in **Appendix D**, Apple provides other services at no cost. If in the but-for world Apple required developers to pay for the SDK and other tools,²³⁷ or increased its annual Developer Program fee or charged separately for each or some of the services it now provides gratis, an immediate effect would be to discourage participation among developers, particularly among smaller developers for whom these elements are more important. Developers who nonetheless continued to use the App Store might offset such cost increases by increasing the prices of their apps or of in-app purchases, or increasing the frequency of in-app advertising. They

²³⁴ Hitt Class Report, at ¶¶ 56, 70.

²³⁵ Mr. Malackowski provides a more detailed discussion of some of Apple’s strategic alternatives and of their disparate impacts on consumers and developers. *See* Malackowski Class Report, at ¶¶ 196-224.

²³⁶ In his deposition, Professor Elhauge opined that in the but-for world Apple could require that all iOS apps undergo app review in order to be usable on an iOS device. *See* Elhauge Deposition, at 279:10-15 (“In your but-for world, you indicate that Apple could still determine, through App Review, which apps to approve to run iOS, but any approved app could be distributed by other app distributors as well; is that a fair statement? A. Yes.”) and 280:1-10 (“THE DEPONENT: No. I think the -- the App Review is to whether or not to approve it to run on the iOS. It’s not specific to the distribution. Q. [...] Well, in the but-for world, some apps would run on iOS after being distributed through Apple’s App Store. Some would run after being distributed through a nonApple [sic] channel, correct? A. Yeah.”). In his report, Dr. Rubin explains that such a requirement would raise important technical and practical issues that Professor Elhauge has not addressed. *See* Declaration and Expert Report of Aviel D. Rubin, Ph.D., *Cameron et al. v. Apple Inc. & In Re: Apple iPhone Antitrust Litigation*, No. 4:19-cv-03074-YGR, No. 4:11-cv-06714-YGR, United States District Court for the Northern District of California, Oakland Division, August 10, 2021, at ¶¶ 159-166.

²³⁷ It could attempt to enforce this requirement by requiring payment as a condition of being allowed to use the Authorized Developer label or something of the sort.

might more aggressively seek to access and sell consumers’ personal data. Other developers would pay for the SDK and related tools but decide to not distribute their apps using the App Store. Still others might cease developing iOS apps entirely.

146. All developers would experience an increase in their costs because of these changes.

Suppose Apple did not try to charge for the SDK and related tools and that it continued to provide a range of services free to developers, but it simply increased the Apple Developer Program access fee from \$99 to \$149. To get a sense of what would be involved, assume a highly simplified (and unrealistic) but-for world resembling the one proposed by Professor Economides in his report. According to Professor Economides, to compute harm to developers one can assume that the quantity of apps sold stays the same.²³⁸ In this but-for world, suppose that all iOS commission rates were 13.0%, in line with Plaintiffs’ experts’ assumptions. Under this scenario, Professor Hitt shows that [REDACTED] percent of developers would have annual damages of less than [REDACTED], which is less than the hypothesized increase in the App Store access fee.²³⁹ In other words, these developers would be paying more in the annual access fee than their annual revenue would increase due to reduced commissions, and they would be worse off if they continued to use the App Store.²⁴⁰ On the other hand, it is not clear what other channels would be available to such small developers to reach consumers effectively in the but-for world.

147. Regardless of how developers would choose to react to these sorts of changes, and their choices would likely differ, some consumers would be harmed because some apps would become more expensive and/or more intrusive, some would not be available on the App Store, and some would simply not be developed.

1. Charging a percentage royalty for the use of Apple’s SDK or of Metal, as Epic charges royalties for the use of Unreal Engine

148. To increase returns from developers who use Apple’s intellectual property to develop iOS apps but choose not to use the App store in the but-for world, Apple could charge a royalty

²³⁸ Economides Report, at ¶¶ 64-67.

²³⁹ Hitt Class Report, at Figure 34.

²⁴⁰ Consistent with the approach taken by Professor Economides in his report, in this simple version of the but-for world, we are ignoring revenue that developers earn from in-app advertising and are assuming that to compute harm it is not necessary to estimate the but-for world quantity of applications that consumers would purchase.

for the use of some or all of its intellectual property. For example, Apple could charge developers a percentage royalty for the Metal API, a graphics framework provided by Apple, similar to the royalties charged by several other two-sided transaction platforms as shown in **Exhibit 5**. For example, Epic charges a comprehensive 5% royalty for the use of its Unreal Engine software.²⁴¹ [REDACTED]

[REDACTED].²⁴² Apple could also choose to structure the royalty in many different ways, such as with a tiered fixed fee system similar to that of Unity Software, which adds complexity to determining Apple’s overall pricing strategy in the but-for world.²⁴³

149. As briefly mentioned in **Appendix D**, the Metal API is a graphics framework software that allows app developers to have their apps use and communicate with the graphics processing unit of the device on which Metal is installed.²⁴⁴ The Metal API was specifically developed to improve the experience of users while playing games, and its capabilities were first demonstrated at Apple’s Worldwide Developers Conference in 2014 using Epic Games’ Zen Garden.^{245,246} While similar applications had existed earlier, Metal significantly improved game performance along several dimensions.²⁴⁷ Thanks to the introduction of the

²⁴¹ “Unreal Engine End User License Agreement For Publishing,” *Unreal Engine*, available at <https://www.unrealengine.com/en-US/eula/publishing>, accessed on March 8, 2021.

²⁴² [REDACTED]

²⁴³ Willig Report, ¶ 206.

²⁴⁴ Albright, Dann, “What makes Apple’s Metal Graphics Technology so Special,” *Make Use Of*, October 27, 2015, available at <https://www.makeuseof.com/tag/makes-apples-metal-graphics-technology-special/>.

²⁴⁵ “Metal Accelerating graphics and much more,” *Developer, Apple*, available at <https://developer.apple.com/metal/>, accessed on July 30, 2021 (“Metal provides a platform-optimized, low-overhead API for developing the latest 3D pro applications and amazing games using a rich shading language with tighter integration between graphics and compute programs. To help you do more while managing ever more complex shader code, Metal adds an unparalleled suite of advanced GPU debugging tools to help you realize the full potential of your graphics code.”).

²⁴⁶ “Epic Zen Garden,” *Epic Games*, available at <https://www.unrealengine.com/marketplace/en-US/product/epic-zen-garden>, accessed on July 30, 2021.

²⁴⁷ Loveridge, Sam, “iOS 8 Metal Explained: How does it affect your iPhone or iPad?” *Trusted Reviews*, September 26, 2014, available at <https://www.trustedreviews.com/opinion/ios-8-metal-explained-how-does-it-affect-your-iphone-or-ipad-2922813> (“Metal offers up to 10 times faster draw call rates, which are used to render all objects in a 3D game. That figure is compared to the performance squeezed out of the A7 with iOS 7. Overall, you should get a more responsive game that’s faster and offered far more detailed environments.

Metal API in 2014, graphics processing became much faster, as Metal allows applications to use both the computing processing unit and the graphics processing unit. This integration improves performance of any graphics-intensive application (such as games) and at the same time does so without using as much battery life as previous applications.²⁴⁸

150. Because not all developers across app categories rely on the services provided by Metal, only some of them would see their costs rise in this but-for world scenario. For example, game developers are more likely to rely on Metal API than developers of biochemistry references or baby name guides. As Epic CEO Tim Sweeney testified, Metal allowed for Fortnite to be ported to iOS without compromising performance, and it presented a significant improvement over existing graphics interfaces APIs that game developers were using.²⁴⁹ “A fast, agile, feature-rich API like Metal” particularly benefited developers of games designed for consoles and desktops, as they could bring those games to iOS more easily than before.²⁵⁰ On the other hand, a comprehensive royalty for the use of Apple’s SDK would nominally affect all developers, particularly those heavily reliant on ad revenues. Because the costs of collecting royalties from very small developers would likely outweigh the benefits, as a practical matter Apple would likely explicitly or implicitly exempt small developers.

There’s also improvements to game load times, as Metal introduces support for precompiled shaders. These are important for a realistic game, as they affect how the environments are coloured and lit.”).

²⁴⁸ Moldrich, Curtis, “All About Metal, Apple’s New Way Of Squeezing Performance From Its Newest iPhones And iPads,” October 17, 2014, *Business Insider*, available at <https://www.businessinsider.com/what-is-metal-apple-iphone-ipad-graphics-2014-10> (“What’s more, Metal’s console-like graphics actually use less system resources, so they’re kinder to your battery life.”).

²⁴⁹ Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 4, 2021, at 249:5-18 (“Q. And what you wrote here, Mr. Sweeney, is Metal gave us the injection of performance required for shipping the full *Fortnite: Battle Royale* experience on iOS quickly with no compromises. Does that mean “compromises”? A. Yes. Right. This is a misspelling. Q. Sure, sure. And then you go on to say, porting a game built for high-end gaming consoles to iOS was a greatly superior experience with Metal than OpenGL. Correct? A. Yes. Q. And did you mean that when you wrote that? A. Absolutely.”).

²⁵⁰ Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 4, 2021, at 250:15-251:1 (“Q. And Mr. Adam’s quote says, we’ve been making use of Metal on iOS since its release in 2014 to great effect. A fast, agile, feature-rich API like Metal is exactly what we need to bring a game designed for modern consoles and desktops to the battery-powered iPhone and iPad. As a developer it blows away OpenGL in every way. We were able to get Fortnite ship-ready on iOS in a handful of months as we weren’t hindered by graphics. Do you see that? A. Yes. Q. And do you agree with that statement? A. Absolutely.”).

151. An example of a business model based on royalties for the use of intellectual property is the Unreal Engine by Epic Games. The Unreal Engine is a game-making toolkit that initially relied on a monthly subscription fee and charged a 5 percent royalty to game developers whenever their games earned more than a set amount.²⁵¹ As of 2015 the Unreal Engine can be downloaded for free and as of 2020 developers do not need to pay the 5 percent royalty until their games gross \$1 million.²⁵²
152. A royalty for use of the Metal API in the but-for world would likely cause some developers to increase their app and/or in-app prices, perhaps charging for an app that is free in the actual world, or increasing the prevalence of in-app advertising or more aggressively collecting consumers’ data. Developers that would opt not to pay for the Metal API would be choosing to reduce the quality of their product as the Metal API guarantees a seamless experience providing consumers more speed, better performance, and less power consumption.²⁵³
153. Some consumers would be harmed by any of these changes and may respond by downloading and purchasing fewer apps. This response on top of the license fee increase may cause some developers to exit the Developer Program or to shift focus to another platform, which would reduce iOS output. Finally, some developers might exit altogether

²⁵¹ Sarkar, Samit, “Epic makes Unreal Engine 4 free,” *Polygon*, March 2, 2015, available at <https://www.polygon.com/2015/3/2/8134425/unreal-engine-4-free-epic-games> (“Epic originally launched Unreal Engine 4 in March 2014 for “early adopters” with a subscription model, charging \$19 per month plus a royalty fee of 5 percent on sales.”).

²⁵² Machkovech, Sam, “Unreal Engine is now royalty-free until a game makes a whopping \$1 million,” *ArsTechnica*, May 13, 2020, available at <https://arstechnica.com/gaming/2020/05/unreal-engine-is-now-royalty-free-until-a-game-makes-a-whopping-1-mill/>, accessed on July 15, 2021.

²⁵³ Albright, Dann, “What Makes Apple’s Metal Graphics Technology So Special?,” *Make Use Of*, October 27, 2015, available at <https://www.makeuseof.com/tag/makes-apples-metal-graphics-technology-special/> (“Metal allows much faster graphics processing from identical chips — according to Apple, up to ten times faster. . . this could also lead to significantly improved battery life”). *See also* Dilger, Daniel Eran, “Editorial: Mac Pro puts the pedal to Metal in Apple’s race with Nvidia,” *Apple Insider*, October 18, 2019, available at <https://appleinsider.com/articles/19/10/18/editorial-mac-pro-puts-the-pedal-to-metal-in-apples-race-with-nvidia> (“Moving to Metal is attractive for developers because it delivers higher performance than OpenGL, and provides access to Apple’s huge installed base of affluent iOS users and its significant base of 100 million higher value Mac users”). *See also* Dilger, Daniel Eran, “Why macOS Mojave requires Metal - and deprecates OpenGL,” *Apple Insider*, September 25, 2018, available at <https://appleinsider.com/articles/18/06/28/why-macos-mojave-requires-metal---and-deprecates-opengl> (“The performance gains from Metal come largely from its optimizations to reduce CPU load, enabling software to much more efficiently make use of the power of the GPU.”).

and not produce apps for any platforms. These likely responses would all reduce, and could eliminate, harm calculated by the plaintiffs’ experts.

2. *Change the number of tiers and commission programs*

154. Professor Economides relies on Professor Elhauge’s unsupported assumption that Apple would have exactly two tiers of commissions in the but-for world. A number of other platforms have more than two tiers of commissions, as **Exhibit 5** shows. Steam has three tiers of commissions based on the revenue a game has earned in the store. Microsoft Store has multiple commission rate tiers based on the app type, and the number of tiers it has had has fluctuated over time. Amazon App Store’s royalty schedule indicates multiple tiers based on the type of app as well.²⁵⁴ It may well be the case that Apple chooses to have additional tiers of commissions in the but-for world, and that these tiers are introduced at various points in time.
155. Different commission rates across multiple tiers in the but-for world would result in developers being affected to varying degrees in the but-for world. For example, Apple could elect to introduce the Small Business Program, or an entirely new program, at a different commission rate, creating an additional tier. This change in the but-for world would affect only the developers that fall under the Small Business Program, but over 90% of all developers are eligible for that Program, and as of mid-May tens of thousands of developers had already enrolled.²⁵⁵ Other developers would be affected by changes in commission rates specific to their tier, which would not necessarily be one of the two existing tiers in the actual world.

3. *Change the ratio of the subscription rate to the main/headline rate*

156. The ratio of the App Store’s subscription rate to its headline rate in the actual world is 1:2, and Professor Economides arbitrarily assumes that this ratio would remain the same in the

²⁵⁴ “Amazon Developer Services Agreement,” *Amazon.com*, last updated June 9, 2021, available at <https://developer.amazon.com/support/legal/da>.

²⁵⁵ Trial Testimony of Philip Schiller, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, May 17, 2021, at 2813:21-2814:16 (“Q. And what percentage of developers are eligible for the small business program? A. Over 90 percent of all developers. [...] Q. And what percentage of eligible developers, or any yardstick you wish to apply, my question really is how many developers have enrolled? A. We have tens of thousands in it at this point. Q. And is that a -- a majority or a minority of those who are eligible? A. I think it’s still a minority of those eligible.”).

but-for world, or that the ratio after accounting for variable costs would remain the same.²⁵⁶ Professor Economides relies on Professor Elhauge to support his assumption that Apple would maintain two tiers of commissions in the but-for world,²⁵⁷ but his assumption that the ratio between the commission rates would remain the same is entirely unsupported: Professor Elhauge only asserts that commission rates for both tiers would be reduced;²⁵⁸ he does not opine that the ratio between the commissions would remain at 1:2. These experts have provided no evidence that the 1:2 ratio is a magic formula that determines what the subscription commission rate should be relative to the headline rate under all competitive conditions. There is no reason to believe Apple or alternative iOS distribution channels could not or would not maintain a different ratio in the but-for world.

157. In the actual world, the subscription rate to headline rate ratio is not universally 1:2. Amazon App Store’s headline commission rate is 30 percent, and subscriptions are generally charged 30 percent (resulting in a 1:1 ratio), except for TV in-app subscriptions which are charged 20 percent (resulting in a 2:3 ratio).²⁵⁹ Even the App Store and Google Play Store do not charge subscriptions at a constant ratio of 1:2 to the headline rate; for the first year, subscriptions are charged the same as the headline rate. Additionally, as **Exhibit 4** shows, prior to June 2016 the ratio of the subscription rate to the headline rate in the actual world was 1:1 on all platforms across all operating systems and devices. It is hard to believe that the ratio would not be 1:1 until June 2016 in the but-for world as well. Apple was the first platform to lower the subscription rate when it did so in June 2016, but Apple may elect to lower the subscription rate, if it lowered it at all, by a different amount and on a different date in the but-for world.

²⁵⁶ Economides Report, at ¶¶ 59-60. Professor McFadden does not deal with this ratio because he erroneously assumes that Apple charges a single commission rate in the actual world and assumes that it would do so in the but-for world.

²⁵⁷ Economides Report, at ¶ 57.

²⁵⁸ Elhauge Report, at ¶ 372 (“Apple would be unlikely to create additional commission tiers in the but-for world given that it has repeatedly decided not to add additional commission tiers in the actual world.”).

²⁵⁹ “Amazon Developer Services Agreement,” *Amazon.com*, available at <https://developer.amazon.com/support/legal/da>, last updated June 9, 2021 (“Subscription In-App Products sold in Mobile Apps: Movies & TV 80%; Other 70%”).

158. Changes in the subscription-to-headline rate ratio in the but-for world would affect developers of subscription apps differently from developers of non-subscription apps. If, for example, Apple decided not to offer a reduced rate for subscriptions at all and employed a 1:1 ratio in the but-for world, then developers of subscription apps would likely be disproportionately worse off than developers of non-subscription apps. Even among developers of subscription apps, some would likely be affected more than others. In the scenario described earlier, developers of “reader” apps offering subscriptions for purchase only outside the App Store may not be affected as much as developers whose apps do not qualify for the “reader” rule and must offer subscriptions through the App Store. Lastly, changes in the subscription-to-headline rate ratio could affect developers’ decisions on whether to offer subscriptions or not.

4. Introduce special discounts for limited groups of developers

159. Contrary to Professor Elhauge’s unsupported assertion that Apple would not create additional tiers of commissions, charge different commissions based on app genre, or negotiate commissions in the but-for world,²⁶⁰ commission rate policies of other app transaction platforms illustrate that other platforms have found special commission rates for select groups of developers to be attractive, which favors some developers over others. For example, Google engaged with [REDACTED] game developers, including [REDACTED], to launch its Games Velocity Program, which provides the developers with [REDACTED] among other services.²⁶¹ The program effectively [REDACTED] [REDACTED] for [REDACTED], the creator of [REDACTED] [REDACTED] the program [REDACTED] [REDACTED], a different program for [REDACTED] [REDACTED], provides eligible developers [REDACTED]

²⁶⁰ Elhauge Report, at ¶¶ 372, 394, 351.

²⁶¹ GOOG_APPL_00127367-372, at 370 (“Cross Google deals (Games Velocity Program) with top game developers providing increased value to both Google and developers [REDACTED] In a typical deal, [REDACTED] [REDACTED]

²⁶² GOOG_APPL_00127367-372, at 372 (“The commercial ‘gives’ represent a [REDACTED] [REDACTED]

Both the Games Velocity Program and [REDACTED] have eligibility requirements that target a select group of developers.²⁶⁴ Apple could engage in similar deals with developers that meet specific qualifications.

160. In the but-for world the App Store could introduce a tiered commission rate anchored on the 30% rate that provides a volume discount for large developers, similar to Steam’s strategy. The App Store could also engage in exclusive deals, as the Epic Games Store has done.²⁶⁵ [REDACTED]

[REDACTED] By construction, such volume discounts or exclusive deals for larger developers would not affect all developers equally; developers not favored by such discounts or deals would likely be harmed by more intense competition from favored developers. And, as different developers and different apps became subject to different commission rates, different members of the consumer class would also be differentially affected.

VI. Plaintiffs’ Experts Have Not Demonstrated Antitrust Injury and Cannot Reliably Measure Harm to Individual Class Members

161. Plaintiffs’ Experts Professors McFadden and Economides present methodologies that they claim can be used to compute harm to individual consumers and developers, respectively.

²⁶³ GOOG APPL 00127546-565, at 547 [REDACTED]

²⁶⁴ GOOG APPL 00127367-372, at 370 (“We have successfully rolled out a [REDACTED] commercial deal structure (Games Velocity Program) which provides qualifying developers [REDACTED] GOOG APPL 00127546-565 at 547 (“Eligibility Criteria: [REDACTED]”)

²⁶⁵ EPIC 00126488-515, at 514 (“Exclusives on Epic’s Diesel PC Marketplace on select new PC titles. Permanent: Epic funds and recoups at higher than [REDACTED] until whole [...] PC SKU only sold @ Epic PC marketplace”); Wilde, Tyler, “There are more Epic Store exclusives coming over the next 2 years than have released so far,” *PC Gamer*, February 5, 2021, available at <https://www.pcgamer.com/there-are-more-epic-store-exclusives-coming-over-the-next-2-years-than-have-released-so-far/>.

²⁶⁶ “Amazon Developer Services Agreement,” *Amazon*, last updated June 9, 2021, available at <https://developer.amazon.com/support/legal/da> (“App Type: Mobile Apps and Mobile App In-App Products; Royalty: 70% of the List Price”).

²⁶⁷ [REDACTED]

Although Professor Elhauge does not measure antitrust harm for proposed class members, his methodology for determining common impact is relied upon by Professor Economides to calculate harm to developers.²⁶⁸ Professor McFadden conceded in his deposition that the starting point for his model is “the simple assumption that there’s a [...] common effect.”²⁶⁹ All three experts’ methodologies are based on deeply flawed models of developer behavior, deeply flawed assumptions about the but-for world, and complete neglect of indirect network effects.

162. Professor McFadden and Professor Economides model each app as a monopolist, with sales that don’t depend on the prices of any other apps,²⁷⁰ and they model developers as maximizing the profits of each app in isolation. As a matter of economic theory, this is inappropriate for monopoly developers with two or more apps that are substitutes (e.g., two racing games) or complements (e.g., a calculator and a translator). In such cases, profit maximization requires the developer to take into account the impact of changes in the price on one app on the sales of other, but both experts rule out such effects by assuming that each app’s sales are affected only by its own price.

²⁶⁸ Economides Deposition, at 256:7-256:25 (“Q. Would -- would your damage calculation be the same if the finder of fact determines that Professor Elhauge’s opinion that there is an anticompetitive tie between iOS smartphones and tablets and iOS app distribution is incorrect? A. Well, if there are findings by the Court that in some way change the anticompetitive effects that I assume, I reserve the right to recalculate. Q. So in particular, if Professor Elhauge’s opinion about this alleged anticompetitive tie was not sustained, you would need to recalculate damages, correct? A. I have stated that if there is -- if the Court changes the anticompetitive facts that I’m taking now as facts, the anticompetitive behavior that Professor Elhauge describes that I’m taking as fact, so if the Court decides, Oh, we’re going to change this, then I preserve the right to recalculate.”) and 152:6-13 (“Q. Is it your opinion that the 30 percent commission charged in the Mac App Store is supracompetitive? A. Look, I mean, this 30 percent comes from iOS. So definitely in the iOS app distribution we have a strong opinion by Professor Elhauge that this is supracompetitive. And I -- I take this anticompetitive behavior as given.”).

²⁶⁹ McFadden Deposition, at 174:13-22 (“Q. Well, did you have any empirical basis for the assumption that you made? A. I would say that it -- it’s not an empirical assumption. It’s a -- it’s a modeling assumption that is to - - you -- you start a model. You keep it as -- as simple as you can to capture the effects that you need to capture, and so this is the -- the starting point is the simple assumption that there’s a common -- common effect, and you elaborate the model as -- if you need to.”).

²⁷⁰ McFadden Report, at ¶¶ 170-174; McFadden Deposition, at 161:6-16 (“Does the quantity of the app downloaded depend on the price of any other app? A. In this equation, as -- as written, it does not; although, those -- some of those features are captured in other variables [...] only the own price enters this demand equation.”); Economides Report, at ¶¶ 64-65; Further Errata Regarding Expert Class Certification Report of Professor Nicholas Economides, *Cameron et al. v. Apple Inc.*, No. 4:19-cv-03074-YGR, United States District Court Northern District of California, Oakland Division, August 3, 2021 (“Economides Further Errata”).

163. This setup is even more obviously inconsistent with the fact that in the actual world, most, if not all, iOS apps have competition from apps offered by other developers. There is competition – price and non-price – among developers that varies in its intensity but characterizes all app categories.²⁷¹ Both Professors McFadden and Economides completely assume this competition away, and yet the degree of competition among developers has important implications for injury and damages to both the developer and the consumer classes. In case of intense competition among developers and low barriers to entry into the iOS developer business, lowering the commission rate uniformly across developers would have no effect on their profits; developers would compete the gains away. Therefore, the actual extent to which developers would benefit from lower commission rates would depend on the ease of entry, the nature and intensity of competition among them, and the shapes of demand and cost functions. Plaintiffs’ experts ignore this critical issue, which determines the division of harm, if any, between developers and consumers.
164. A recently published paper studies developer concentration in the Google Play Store from 2015 until 2018, an indicator of the likely intensity of competition. The authors divide the apps on the store into a large number of clusters of closely competing apps (which they describe as markets) and find the majority of these clusters to be unconcentrated.²⁷² The authors note that the “average app has a market share of two percent,” whereas the “median app has a market share of below one percent,”²⁷³ and find that the average HHI across clusters is 1,500,²⁷⁴ which is on the border between unconcentrated and moderately

²⁷¹ For example, Cameron’s Lil’ Baby Names app and Pure Sweat Basketball Inc’s Pure Sweat Basketball Workout app face competition from similar apps, both paid and free. See **Exhibits 2 and 3**.

²⁷² Kesler, Reinhold, Michael Kummer, and Patrick Schulte, “Competition and Privacy in Online Markets: Evidence from the Mobile App Industry,” *ZEW Discussion Paper*, December 4, 2019, at p. 11 (“Regarding competition, we document an especially high degree of heterogeneity among the various markets in the mobile app industry [...] The average app is active in a market with an HHI equal to 0.15 (averaged across clusters).”) and p. 8 (“[W]e assume that the relevant market consists of the set of similar apps from its own category”).

²⁷³ Kesler, Reinhold, Michael Kummer, and Patrick Schulte, “Competition and Privacy in Online Markets: Evidence from the Mobile App Industry,” *ZEW Discussion Paper*, December 4, 2019, at p. 12.

²⁷⁴ Kesler, Reinhold, Michael Kummer, and Patrick Schulte, “Competition and Privacy in Online Markets: Evidence from the Mobile App Industry,” *ZEW Discussion Paper*, December 4, 2019, at p. 11. The authors calculate an average HHI of 0.15 and note that they compute the HHI on a range between 0 and 1, rather than 0 to 10,000.

concentrated markets as defined by the U.S. Merger Guidelines.²⁷⁵ On the other hand, the authors present a histogram of clusters’ HHIs that reveals high concentration in some clusters, suggesting weak competition in those markets.²⁷⁶

165. Competition among developers also involves choice of monetization model, another essential element of the actual world ignored by Plaintiffs’ experts. In the actual world, developers have a range of monetization options available (Paid Download IAP, Paid Download Only, Free Download IAP, Advertisement only, entirely Free, and all the potential hybrids among these).²⁷⁷ Even if the same strategies were available in the but-for world, there is no reason to assume, as both Professor McFadden and Professor Economides assume, that developers would not only offer exactly the same apps in the but-for world but would adopt the exact same app-specific monetization strategies.²⁷⁸ In addition, even though they assume lower commission rates, which, all else equal, would make the iOS app development business more attractive, they assume no additional entry in the but-for world.
166. Professor Economides completely ignores developers’ revenue from in-app advertising. Professor McFadden is aware of in-app advertising,²⁷⁹ but, even though differences in apps’ reliance on advertising affects their developers’ profit-maximizing responses to changes in commission rates, he does not explicitly consider differences among apps and developers in reliance on advertising. Although Professor McFadden mentions that ad-supported apps

²⁷⁵ “Horizontal Merger Guidelines,” *U.S. Department of Justice and the Federal Trade Commission*, August 19, 2010, at p. 19.

²⁷⁶ Kesler, Reinhold, Michael Kummer, and Patrick Schulte, “Competition and Privacy in Online Markets: Evidence from the Mobile App Industry,” *ZEW Discussion Paper*, December 4, 2019, at p. 13.

²⁷⁷ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021.

²⁷⁸ McFadden Deposition, at 112:4-10 (“Q. And -- and what -- what’s the first thing that’s happening in the but-for world, aside from prices, compared to the actual world? What’s different about the but-for world aside from pricing? A. In -- in the but-for world that I modeled, that is the only difference[.]”); Economides Deposition, at 247:18-248:4 (“Q. And in the analysis that you undertake in your report with respect to figure 3, the only change the developer experiences is a fall in his or her commission, right? A. He -- now the developer faces a lower demand curve. So originally in the but-for world, let’s say he was facing the blue line from C [...] going down all the way to Q, and now he’s facing the orange line called D2, which is a smaller willingness to pay, because the remaining [...] was sucked up by [...] by Apple.”).

²⁷⁹ McFadden Report, at ¶ 170 and footnote 245.

can have negative marginal costs,²⁸⁰ neither expert seriously considers the complex decision that developers face when choosing their sources of revenue between revenue from advertising, IAP, pay apps, and the various mix of these three sources. Because revenue from advertising is important for some developers, this complex decision would surely be different in the but-for world as a consequence of market changes.

167. Their neglect of advertising, and the differences in advertising across app categories, is particularly problematic. In a survey conducted by App Annie, 81 percent of game app developers and 49 percent of all other app developers reported using in-app advertising as a monetization model.²⁸¹ Approximately 64 percent of the most-downloaded iOS apps and 84 percent of the most-downloaded iOS game apps receive advertising revenue.²⁸² In 2020, total in-app advertising revenue amounted to about \$46 billion, roughly evenly divided between game and non-game apps.²⁸³
168. As Professor Willig has demonstrated,²⁸⁴ all else equal, the profit-maximizing change in a paid app’s price in response to a fall in its commission rate depends on how important advertising revenue from an incremental user is relative to the marginal cost of an additional user. If advertising is particularly important, the profit-maximizing response to a fall in the commission is to *raise* the price of a paid app. Consumers of such apps would clearly be worse off in the but-for worlds posited by plaintiffs’ experts.
169. Moreover, in the but-for world, developers of some free apps that rely heavily on advertising and that face a reduction of the commission rate may decide that the profit-maximizing response is for their apps to become paid apps. This would, of course, make

²⁸⁰ McFadden Report, at ¶ 225.

²⁸¹ Miller, Matt, “Monetization Insights from App Professionals,” *App Annie*, available at <https://www.appannie.com/en/insights/mobile-strategy/app-marketers-developers-survey-2/>, accessed on July 16, 2021 (“Monetization Methods: In-app advertising: Apps Excluding Games 49%; Games 81%”).

²⁸² Hitt Rebuttal Report, at Exhibit 42. Of the top 25 apps by downloads, 64 percent have in-app advertising; of the top 25 game apps by downloads, 84 percent have in-app advertising.

²⁸³ Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “A Global Perspective on the Apple App Store Ecosystem,” *Analysis Group*, June 2021, at A-8, available at <https://www.apple.com/newsroom/pdfs/apple-app-store-study-2020.pdf> (“Technology research firm Omdia estimated that in-app ad sales for iOS apps were \$46 billion in 2020, with almost \$19 billion (41%) tied to gaming apps.”).

²⁸⁴ Willig Report, at ¶ 232.

some consumers worse off – including, almost certainly, some consumers in the putative class who in the actual world accessed the app for free. In fact, survey results conducted by Professor Simonson show that consumers who transact in the App Store rank free apps as the most important feature after only privacy and malware protection.²⁸⁵ Furthermore, 59 percent of respondents who purchased apps or made in-app purchases say that the number of free apps offered by the App Store is a “must-have” feature.²⁸⁶

170. These results show that plaintiffs’ neglect of both free apps and advertising is a particularly serious flaw in their analyses. In fact, free apps account for over █ percent of apps in the App Store and these apps often compete with apps offered by members of the developer class.^{287,288} The developer class consists of only █ percent of all developers that have transacted with consumers through the U.S. App Store storefront,²⁸⁹ because it is artificially defined to exclude the █ percent of developers who only developed entirely free apps during the class period. Therefore, if plaintiffs’ remedies for a developer class that includes only █ percent of all developers will reduce the attractiveness of the App Store to developers of free apps, such remedies have the potential to harm the other █ percent of all developers that have transacted with consumers through the U.S. App Store storefront during the developer class period.²⁹⁰

171. Professor McFadden and Professor Economides assume that in the but-for world the App Store lowers its commissions and all transactions pay those same lower commissions.²⁹¹ This is arbitrary and inconsistent with evidence that in the actual world (a) online stores

²⁸⁵ Simonson Report, at Exhibit 7.

²⁸⁶ Simonson Report, at Exhibit 11.

²⁸⁷ Hitt Written Direct Testimony, at ¶ 108.

²⁸⁸ See **Exhibits 2 and 3**.

²⁸⁹ Hitt Class Report, at ¶ 56.

²⁹⁰ Hitt Class Report, at ¶ 56.

²⁹¹ McFadden Deposition, at 157:18-24 (“In my but-for world, my assumption is that the forces of competition would drive the Apple Store commission rate down to the -- the benchmark level for which the calculation is done and that that would -- those forces of competition would have the uniform effect across -- across different genres, for example.”); Economides Deposition, at 260:5-16 (“[I]n the but-for world every member of the class would be better off, every member -- every developer would be -- would be better off [...] Not only I believe that Apple’s commission is going to go down, but additionally the developers would be able -- would be able to distribute through multiple stores and also self-distribute and be able to achieve lower effective commission fee and, therefore, be better off.”).

owned by operating system vendors have not lowered their headline commission rates in response to competition on the same device from other stores and direct distribution, and (b) as a result, developers of apps for systems with competition in distribution have paid a wide variety of distribution costs.²⁹²

172. Professor McFadden and Professor Economides assume that except for its commission rates, the App Store would leave all other elements of its monetization strategy unchanged. In fact, it is likely that Apple would change other elements of that strategy, and some plausible changes would leave many developers and consumers worse off in the but-for world.

A. Professor Elhauge

173. Professor Elhauge does not measure antitrust harm for proposed class members, but he concludes that all developers were harmed, since commission rates for all developers would be lower in the but-for world.²⁹³ He does not support this conclusion with any independent analysis of but-for world commission rates and instead refers to Professor Economides’ estimates that the but-for world commission rates would have been in the range 13.0-14.8%.²⁹⁴ In his deposition, Professor Elhauge conceded that he did not assess the reliability of the methodology used to arrive at the but-for world commission rates he cites.²⁹⁵ Professor Elhauge also claims that, in the but-for world, Apple’s pricing policy for the App Store would look identical to its policy in the actual world, except for a downward shift in commission rates: Apple would continue to have two tiers of commissions as in the actual world, and each tier’s commission rate would be lower than that in the actual world.²⁹⁶ In addition, Apple would not negotiate any commission rates individually.²⁹⁷

²⁹² See **Exhibit 4**.

²⁹³ Elhauge Report, at ¶ 340.

²⁹⁴ Elhauge Report, at ¶ 339.

²⁹⁵ Elhauge Deposition, at 141:17-142:6 (“Q. Okay. Did you consider Professor Economides’ but-for world yardstick to be a reliable economic model? A. I didn’t do any independent assessment of it. [...] I haven’t done an independent economic analysis. [...] Q. So you didn’t indicate in your report that you thought Professor Economides’ but-for world yardstick involved a reliable economic model? A. I -- I don’t think I offer an affirmative opinion about that.”).

²⁹⁶ Elhauge Report, at ¶ 351.

²⁹⁷ Elhauge Report, at ¶ 351.

174. Professor Elhauge’s claim that Apple would not change anything about its pricing policies except for lowering the commission rates is entirely arbitrary. Professor Elhauge concludes that Apple would maintain two tiers in the but-for world simply because it has two tiers in the actual world.²⁹⁸ This argument is absurd. Just because Apple has found it optimal to have two tiers of commissions in the actual world does not preclude it from finding a different number of tiers to be optimal in the very different but-for world. Platforms have found varying numbers of tiers to be optimal in the actual world, as shown in **Exhibit 5**, and Apple could very well find a different number of tiers to be optimal in the but-for world. Apple currently has multiple commission programs, such as the Small Business Program, the Video Partner Program, and the commission rate on subscriptions after one year, and not only could Apple choose to price each program differently in the but-for world, but Apple could also create additional programs with different prices.
175. Professor Elhauge also seems to think that Apple would not negotiate commission rates with individual developers, just because it has not done so in the past and “as a matter of policy.”²⁹⁹ Just because Apple has not individually negotiated commission rates in the actual world does not mean it would not find it optimal to do so in the but-for world. **Exhibit 5** shows that special negotiated commission rates are not uncommon, and it would not be out of the norm for Apple to also individually negotiate rates in the but-for world.
176. Professor Elhauge’s claim that commission rates would be reduced across all tiers relies on his unsupported view that in the but-for world “Apple would face increased competition for *every* developer.”³⁰⁰ According to Professor Elhauge, all developers will have the option to self-distribute or use another platform to reach consumers.³⁰¹ Even if a developer would face an increase in their costs to distribute through alternative platforms or to self-distribute, Professor Elhauge assumes Apple would face increased competition for that developer,³⁰² which is unlikely. Furthermore, given that competitive conditions vary across different

²⁹⁸ Elhauge Report, at ¶¶ 364, 372.

²⁹⁹ Elhauge Report, at ¶ 352.

³⁰⁰ Elhauge Report, at ¶ 346.

³⁰¹ Elhauge Report, at ¶ 346.

³⁰² Elhauge Report, at ¶ 346.

types of apps, the set of alternative distribution methods would likely not be the same across all types of apps. As I discussed above in **Section V**, it is most likely that in the but-for world Apple would not respond to the entrance of third-party iOS distribution channels by lowering its commission rates. If it in fact did decide to change its commission rates, Apple may find that it is optimal to not change the rate for one or more tiers, or to introduce new tiers and keep others at the same rate.

177. Professor Elhauge’s flawed conclusions about Apple’s pricing in the but-for world are the foundation upon which Professor Economides calculates harm to developers. Professor Economides, relying on Professor Elhauge, assumes that Apple’s pricing policy would have two tiers of commissions and that both tiers’ commissions would be reduced relative to the actual world.³⁰³ As I will show in the next section, this assumption is just one of many flaws in Professor Economides’ analyses.

B. Professor Economides

178. In his report, Professor Economides takes defendants’ antitrust liability as given and presents his methodologies to measure harm to members of the developer class.

1. Professor Economides’ Yardsticks

179. Professor Economides adopts the yardstick method to estimate commission rates in the but-for world, because, he argues, “[s]ince Apple has never allowed any rival app stores to distribute iOS apps [...] it is impossible to compare current App Store commission rates to some competitive period (a ‘benchmark’).”³⁰⁴
180. Professor Economides proposes “two potential yardsticks”³⁰⁵ that allow him to compute harm to members of the developer class. These yardstick methods focus exclusively on calculating the commission rates that according to him would have prevailed in the but-for world. Professor Economides seems to assume that nothing else would change in the but-

³⁰³ Economides Report, at ¶ 57 (“As Prof. Elhauge has shown, it is likely that Apple would also charge a two-tiered price in the but-for world”).

³⁰⁴ Economides Report, at ¶ 9.

³⁰⁵ Economides Report, at ¶ 30.

for world other than the App Store commission rates.³⁰⁶ For example, he “conservatively assumes developers would have continued to pay the \$99 annual developer fee” in the but-for world.³⁰⁷

181. After reviewing several potential candidate platforms for use in yardstick determination, Professor Economides excludes video game consoles because “the economics of video game console stores are quite different from the economics of general purpose computing device app stores.”³⁰⁸ The first of the two potential yardsticks chosen by Professor Economides is the “Windows PC app distribution market.”³⁰⁹ Professor Economides selects two stores distributing third-party game apps (Epic and Steam), one general purpose app distribution store (the Microsoft Store), and five stores that distribute their own apps.³¹⁰ In doing so, Professor Economides is assuming that the commission rates of two-sided transaction platforms distributing primarily video games, such as the majority of those he selected in Table 4 of his report, are a good yardstick for commission rates for non-gaming apps.³¹¹ In addition, he justifies using the commission rates that these platforms charge on self-distributed apps to compute the but-for commission rates but fails to consider any fixed cost that developers would have to incur to achieve self-distribution when he computes damages.
182. Professor Economides computes a weighted average commission rate based on the sales of each of his platforms and claims that the [REDACTED] figure he calculates is a valid measure of the average but-for commission rate for the entire class of developers and for the entire

³⁰⁶ Economides Deposition, at 111:17-19 (“I did not set up any additional fees to Apple in the but-for world besides the -- the commission fee, which I calculate.”). Professor Economides also does not opine on whether Apple’s pricing tiers would change. *See id.*, at 33:18-24 (“Q. Well, do you assume that 99-cent price tiers will continue to exist in the but-for world? A. Well, given the way that Professor Elhauge’s report is written, it is possible that they will continue, and it’s possible they wouldn’t. I am, to -- to a significant extent, agnostic on this.”).

³⁰⁷ Economides Report, at Section III.B.

³⁰⁸ Economides Report, at ¶ 37.

³⁰⁹ Economides Report, at ¶¶ 31, 35-36, 38.

³¹⁰ Economides Report, at ¶¶ 35-38 and Table 4. The five stores for which direct distribution costs are reported are Steam, Epic Games Store, Blizzard.net, Origin, and WeGame.

³¹¹ Economides Report, at ¶¶ 35-38 and Table 4.

class period.³¹² If one excludes the five estimates of the cost of self-distribution, which have nothing to do with charges for third-party distribution, the weighted average effective commission rate becomes 24.8%.³¹³ If one excludes the Epic Games store, which is operating at a loss, the average rises to 25.4%.³¹⁴

183. Professor Economides calculates his second yardstick for the commission rate in the but-for world based on an analysis of how the App Store commission rates would change in the event of entry from one or two competitors.³¹⁵ To do so, he relies on the profit margins of a set of “online marketplaces with agency-based businesses:” eBay, Etsy, Rakuten, MercadoLibre, and Alibaba.³¹⁶ In his view these businesses are comparable to the App Store along several important dimensions even though none of them facilitates transactions between app developers on one side of the platform and consumers on the other side.³¹⁷ To construct his but-for world yardstick, Professor Economides relies on profit margins calculated by Mr. Tregillis for these online marketplaces³¹⁸ and makes a number of implausible and unrealistic assumptions about competitors in the but-for world:

- i. Throughout the developer class period, competitors (new entrant stores) have a cost structure that is identical to the weighted average of the App Store’s fixed and variable costs computed in 2018 and 2019.³¹⁹

³¹² Economides Report, at ¶¶ 38-39 and ¶¶ 75-76.

³¹³ This is a weighted average of the commission rates shown in Professor Economides’ Table 4 for third party sales for Steam, the Epic Games Store, and the Microsoft Store.

³¹⁴ This is a weighted average of the commission rates shown in Professor Economides’ Table 4 for third party sales for Steam, and the Microsoft Store.

³¹⁵ Economides Report, at ¶ 41.

³¹⁶ Economides Report, at ¶¶ 40, 43.

³¹⁷ Economides Report, at ¶¶ 42-43.

³¹⁸ Economides Report, at ¶ 45.

³¹⁹ Economides Report, at ¶ 51.

- ii. Competitors’ entry starts on the first day of the developer class period, and they immediately gain significant market shares in the distribution of every app category that is currently sold on the App Store.³²⁰
- iii. Professor Economides assumes that all but-for competitors charge a commission rate to developers that is identical to the one charged by Apple even though Professor Elhauge explicitly claims the opposite in his report,³²¹³²² and Professor Economides himself shows a range of commission rates paid by developers of Windows apps.³²³
- iv. He finds that the but-for commission rates for the App Store would be 14.8% if only one platform entered and 13% if two platforms entered.³²⁴ He assumes that these but-for average commission rates apply to all developers for the entire class period.³²⁵
- v. Professor Economides relies on Professor Elhauge’s claim that in the but-for world, Apple would continue to offer what Professor Economides calls “a two-tiered commission rate.”³²⁶ Professor Economides assumes that all developers would pay one of the two but-for commission rates. He computes these rates in his report assuming that the average but-for commission rate

³²⁰ Economides Deposition at 42:18-25 (“Q. (By Mr. Swanson) All right. So what are you assuming is different on June 4th, 2015, that is your issue? A. That there is no anticompetitive actions of Apple and that there is distribution through--the unencumbered distribution through stores by other parties. And also through direct downloads from developers.”); Economides Report, at ¶¶ 75-76.

³²¹ Economides Report, at ¶¶ 51-52 (“I additionally assume that all firms in the market would charge the same commission rate to developers.”).

³²² Elhauge Report, at ¶¶ 324-325 (“In the But For World, Profit-Maximizing Commissions Would Vary Significantly Between Different iOS App Distributors Due to Firm Asymmetries [...] [I]t is unlikely that all the rival iOS app distributors in the but-for world would decide to charge the same commission as Apple charges in the actual world because there would be significant variation in the different firms’ individually profit-maximizing commissions. Apple and its rival iOS app distributors would have varying profit-maximizing commissions in the but-for world because: (i) their products would be vertically differentiated; and (ii) they would likely have different business strategies.”).

³²³ Economides Report, at ¶ 38 and Table 4.

³²⁴ Economides Report, at ¶¶ 48-52.

³²⁵ Economides Report, at ¶¶ 46-52 (“To find a common yardstick rate during the class period [...] I calculate the but-for commission rate for each scenario.”) and ¶¶ 75-76.

³²⁶ Economides Report, at ¶ 57 (“As Prof. Elhauge has shown, it is likely that Apple would also charge a two-tiered price in the but-for world.”).

should equal the average of the two but-for commission rates weighted by share of sales in each tier in the actual world, and he makes two alternative, completely arbitrary assumptions about the ratio of the two but-for commission rates that attach special significance to the 2:1 actual ratio.³²⁷

2. *Professor Economides’ Damages Calculations*

184. Using these but-for commission rates, Professor Economides proceeds to calculate damages for developers. The methodology presented in Professor Economides’ report and his description of his opinions during his deposition are in stark contradiction with each other. Most importantly, in his report Professor Economides describes a but-for world where, in response to a lower commission rate, developers may have found it optimal to charge a lower price to consumers and that, in response to lower prices, developers may have been able to sell more apps.³²⁸ In his deposition Professor Economides changed his opinion, asserting that, in his view, almost all app prices would be unlikely to change in the but-for world.³²⁹ In fact, Professor Economides did not think that overall output or the output of any individual app would be higher in the but-for world.³³⁰
185. In his report, Professor Economides puts forward Figure 3, reproduced below, where he depicts the demand function faced by each application in the actual and but-for world,

³²⁷ Economides Report, at ¶¶ 58-60.

³²⁸ Economides Report, at ¶ 64.

³²⁹ Economides Deposition, at 241:12-23 (“Q. (By Mr. Swanson) You agree that you calculate damages assuming that developers would not change their prices, correct? [...] THE DEPONENT: Yes. Q. (By Mr. Swanson) And are you testifying now that you believe that assumption is 100 percent accurate as a factual matter? [...] THE DEPONENT: Well, I already explained why I think it’s a -- it’s a very, very, very reasonable assumption.”), and at 239:13-19 (“Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it’s zero, or if it’s small, the -- there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world.”).

³³⁰ Economides Deposition, at 245:15-246:13 (“Q. [...] Professor, is it your opinion that output in the but-for world will be higher in the relevant market than in the actual world? A. Let me try to answer that. Whether that is the case will depend on whether a particular developer has a high marginal cost and is able to cut price and can sell more and has a guarantee that he would sell more and that the price cut that he does fit the 99 cent tiers. So these are three different conditions which, in my opinion, are unlikely to be met. Q. Okay. A. Therefore, most likely, we are going to be with the same quantity in the but-for world as now. Q. And that’s true at the level of the market? A. I’m sorry? Q. Is that your opinion at the level of the market? [...] THE DEPONENT: That’s correct. And individually as well.”).

respectively.³³¹ With this framing, Professor Economides assumes away competition among developers and treats each application as a monopolist facing no direct competition from other applications, so that any changes in the prices of other apps in the but-for world have no effects on the demand for the app depicted or any other app in the iOS App Store.³³² He assumes no entry of developers or new apps. That said, this Figure, and Professor Economides’ description of it suggests that, in the but-for world, in response to a lower commission rate, developers may have found it optimal to charge a lower price to consumers and that, in response to lower prices, developers may have been able to sell more apps.^{333,334}

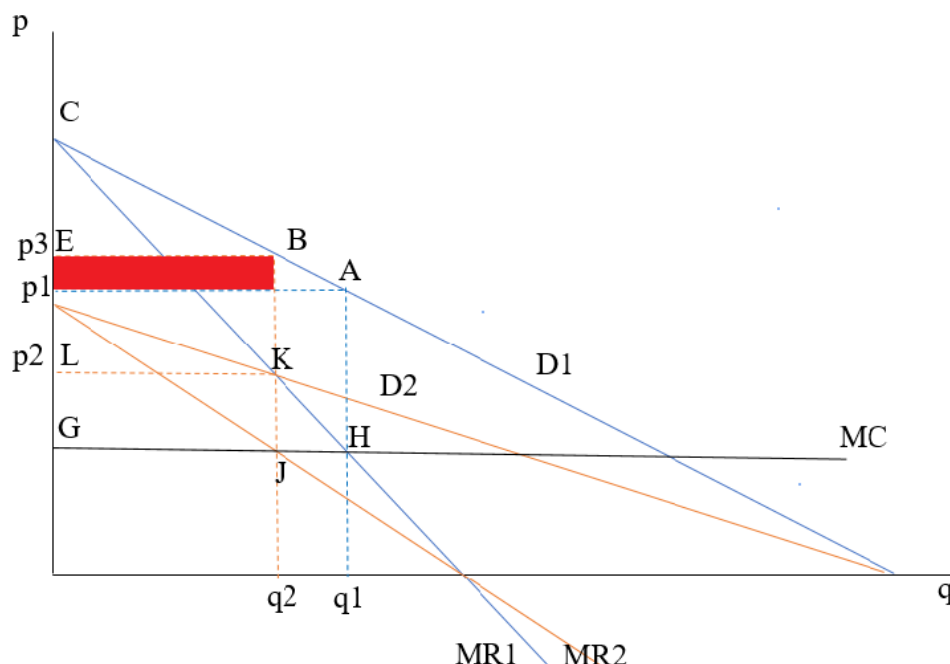
³³¹ Economides Report, at ¶ 65; Economides Further Errata, at Figure 3.

³³² Economides Report, at ¶¶ 64-67; Economides Further Errata, at Figure 3.

³³³ Economides Report, at ¶ 64 (“Since in the but-for world they face a lower commission rate, developers may have found it optimal to charge a lower price. [...] Assuming their pricing is profit maximizing given the Apple commission at present, basic economics shows us that developers might be able to increase their total revenue by cutting their price in the but-for world and selling more apps.”).

³³⁴ In contrast, despite this basic textbook point, in his deposition Professor Elhauge asserted that almost all app prices would be unlikely to change in the but-for world. Elhauge Deposition, at 39:7-40:8 (“Q. [...] And what was your understanding of how much pass-through Professor McFadden concluded did occur? [...] THE DEPONENT: [...] [I]f you combine that economics with the price tiering, it seemed to me that it’s very unlikely to result in any pass-through if -- if -- if the 99-cent tiering remains”) and 42:20-25 (“Q. [...] If pass-through is very unlikely, does that imply that in the but-for world, app prices are unlikely to change? [...] THE DEPONENT: Yes. I think app prices are unlikely to change in the but-for world[.]”) and 250:20-251:1 (“Q. [...] So in your view, consumers have less choice in the but-for world, but all prices are essentially the same for all the same apps and in-app products; is that correct? [...] THE DEPONENT: [...] I think almost all prices for apps would be the same.”).

Figure 1
Reproduction of Professor Economides’ Figure 3³³⁵



186. This setup, presented in Professor Economides’ report, seems to suggest a lost profits calculation in which one would compare the difference in profits between the actual and but-for world that has been caused by the alleged conduct.³³⁶ To accurately compute developers’ lost profits would require re-computing the equilibrium prices charged by developers and the quantity of apps bought by consumers in the but-for world under Professor Economides’ but-for commission structure, taking into account any pass-through from developers to consumers. As noted above, pass-through refers to the extent to which selling prices change in response to changes in costs.³³⁷ Pass-through reflects decisions by individual developers and as well as competitive pressures. Economic theory says that with very intense competition, particularly with easy entry, developers would pass through any

³³⁵ The shaded red area has been added to the original figure submitted by Professor Economides in his errata. See Economides Further Errata, at Figure 3.

³³⁶ Lost profits are damages corresponding to the amount that the plaintiff’s profits were reduced as a result of anticompetitive actions. This is sometimes different from damages based on overcharges, which correspond to the amount by which a plaintiff paid too much. See “*Proving Antitrust Damages: Legal and economic issues*,” *American Bar Association*, 2010, at p. 104.

³³⁷ The extent of pass-through depends on the intensity of competition and on the shapes of demand and cost functions. See ¶ 128.

cost reductions in the but-for world completely to consumers and would not themselves be injured in the actual world. With less intense competition, developers would benefit to various degrees from hypothetical cost reductions. To determine how much any developer would benefit from a hypothetical commission reduction would at least require individualized inquiry into the competitive pressures faced by that developer.

187. Instead, in his report, Professor Economides takes a number of arbitrary and unrealistic shortcuts, under the pretense of being “conservative” and “defendant-friendly.”³³⁸

Professor Economides assumes that in the but-for world developers would not reduce their prices in response to lower costs (*i.e.*, he makes the extreme assumption of zero pass-through).³³⁹ Professor Economides also assumes that consumers would purchase the same quantities in the but-for world as observed in the actual world and would pay the same prices as in the actual world.³⁴⁰ This is equivalent to assuming that all consumers receive zero benefits in the but-for world and therefore are not harmed. Professor Economides assumes that, if in fact prices were lower in the but for world, damages would be higher than the amount he calculated.³⁴¹

188. However, in his deposition Professor Economides asserted that, in his view, almost all app prices would be unlikely to change in the but-for world.³⁴² To back up this claim, Professor Economides stated that, in order for developers to reduce their price, three conditions are required that are unlikely to be met in the but-for world: (1) “need to have a high marginal costs,” (2) “need to be able to credibly show that you will be able to make higher sales at

³³⁸ Professor Economides notes 17 times in his report that his damages calculations are “conservative” and 6 times that they are “defendant-friendly.”

³³⁹ Economides Report, at ¶ 64.

³⁴⁰ Economides Report, at ¶¶ 64-67.

³⁴¹ Economides Report, at ¶ 64.

³⁴² Economides Deposition, at 241:12-23 (“Q. (By Mr. Swanson) You agree that you calculate damages assuming that developers would not change their prices, correct? [...] THE DEPONENT: Yes. Q. (By Mr. Swanson) And are you testifying now that you believe that assumption is 100 percent accurate as a factual matter? [...] THE DEPONENT: Well, I already explained why I think it’s a -- it’s a very, very, very reasonable assumption.”), and 239:13-19 (“Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it’s zero, or if it’s small, the -- there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world.”).

the lower price in the but-for world,” and (3) “need to be able to show that your particular discount would fit in the grid from 3.99 to 2.99 or 1.99.”³⁴³

189. Despite Professor Economides’ assertion that his approach is “conservative,”³⁴⁴ except in the extreme case in which *all* app and in-app prices are in fact unchanged in the but-for world, this approach can show injury where none exists. Suppose developer A charges the same price for its single app in Professor Economides’ but-for world as in the actual world, but developer B, which markets an app that is a close substitute for A’s app, lowers its price in the but-for world because it has a higher marginal cost than developer A. The lower price of developer B’s app will lower the demand for A’s app, and it is quite possible that on balance A is worse off in the but-for world than in the actual world.
190. In his report, Professor Economides then proceeds to calculate damages to developers as the difference between the average commission rate paid by developers in the actual world and his estimate of the average commission rate in the but-for world, times total app revenue in the actual world.³⁴⁵ Although Professor Economides does not characterize it this way in his report, this approach is not a lost profits analysis but rather is equivalent to an overcharge methodology assuming zero pass through.³⁴⁶

³⁴³ Economides Deposition, at 241:12- 242:14 (“Q. [...] You agree that you calculate damages assuming that developers would not change their prices, correct? [...] THE DEPONENT: Yes. Q. [...] And are you testifying now that you believe that assumption is 100 percent accurate as a factual matter? [...] THE DEPONENT: Well, I already explained why I think it’s a -- it’s a very, very, very reasonable assumption. First to be able to have an incentive to change the price, you need to have a high marginal costs, and I believe that in most cases, we do not have a high marginal cost for these apps. Second, you need to be able to credibly show that you will be able to make higher sales at the lower price in the but-for world, and I think that’s a high hurdle. And third, you need to be able to show that your particular discount would fit in the grid from 3.99 to 2.99 or 1.99. These are very hard conditions to meet, and I believe that the calculation I have done is conservative and safe, and it will give to every person in the class an amount by which they were injured, on the average.”).

³⁴⁴ Economides Report, at ¶ 64 (“This measure of damages is conservative, because app developers could have achieved this additional revenue in the but-for world, simply by setting the same app price in the but-for world as in the actual world.”).

³⁴⁵ Economides Report, at ¶ 64.

³⁴⁶ “Proving antitrust damages: Legal and economic issues,” *American Bar Association*, 2010, at p. 223 (“Most overcharge models are designed to determine the relevant product prices that would have prevailed but for the anticompetitive behavior and compare these but-for prices to the actual prices paid. The overcharge is typically calculated as the difference between the price actually charged and the but-for price, after controlling for all factors that may affect supply and demand of the relevant product.”).

191. In his deposition, however, Professor Economides agreed that his approach is equivalent to an overcharge methodology.³⁴⁷ Professor Economides went further, claiming that his methodology to compute harm is equivalent to both a lost profits and an overcharge measure of harm because “it takes into account costs or variable costs of the developers. And, therefore, if the fixed costs were the same, the overcharge would translate to lost profits.”³⁴⁸ This is incorrect. Lost profits and overcharge are different measures of harm that are only identical under the very specific and unrealistic assumptions that Professor Economides has imposed on his but-for world. An overcharge methodology requires comparing the but-for price with the actual price holding quantity constant.³⁴⁹ On the other hand, lost profit requires computing the optimal price and quantity that would have prevailed in the but-for world, and comparing profits between the actual world and the but-for world, something that Professor Economides did not do in his report. The only case in which the two can be the same is when the but-for quantity is identical to the quantity observed in actual world. This scenario is inconsistent with Professor Economides’ description of his but-for world in the text of his report and Figure 3; it can be true only under the extreme assumption he defended in his deposition that actual and but-for quantities are identical.
192. Professor Economides’ actual calculation of damages to developers as presented in his report includes a portion of what would be consumer benefits if he had allowed for pass-through.³⁵⁰ To see that Professor Economides erroneously includes a portion of damages to

³⁴⁷ Economides Deposition, at 38:16-25 (“Q. What -- what is your measure of harm? A. Well, I -- I am calculating, you know, very briefly the average price that would exist in the but-for world and compare it with the fees, the commissions, that Apple charges in the present world, in the actual world. Q. Is that an -- an overcharge measure of harm? A. You can call it an overcharge measure of harm. Yes, you can.”).

³⁴⁸ Economides Deposition, at 38:16-39:8 (“Q. What -- what is your measure of harm? A. Well, I -- I am calculating, you know, very briefly the average price that would exist in the but-for world and compare it with the fees, the commissions, that Apple charges in the present world, in the actual world. Q. Is that an -- an overcharge measure of harm? A. You can call it an overcharge measure of harm. Yes, you can. Q. Is it -- is it a lost profits measure of harm? A. It can also be thought of as a lost profits measure of harm because the way I do the calculation, it takes into account costs or variable costs of the developers. And, therefore, if the fixed costs were the same, the overcharge would translate to lost profits.”).

³⁴⁹ See “Proving antitrust damages: Legal and economic issues,” *American Bar Association*, 2010, at p. 90 (Overcharge damages “are measured as the difference between the price the plaintiff actually paid and the price that would have prevailed in the absence of the antitrust violation (the ‘but-for’ price), multiplied by the quantity of the product that was actually purchased.”).

³⁵⁰ Economides Report, at ¶¶ 64-67; Economides Further Errata, at Figure 3.

consumers in his estimate of damages, let’s revisit Professor Economides’ Figure 3. The developer’s profit-maximizing price (net of commission) and quantity in the actual world are p_2 and q_2 , respectively, and p_1 and q_1 in the but-for world. Professor Economides notes that with marginal cost (MC), “profits for the developer in the but-for world are represented by area HAFG, [... and] profits for the developer in the actual world are represented by area JKLK.”³⁵¹ To calculate the difference between the developer’s profits in the but-for world and its profits in the actual world, even under the unrealistic assumption that each developer was a monopolist, would clearly require knowing that developer’s individual demand curve.

193. Instead, Professor Economides calculates damages to developers as “KBEL, the difference between developer’s revenue in the but-for world and the actual world.”³⁵² He shows that under his assumption that the developer of the application is a monopolist, this quantity is less than the developer’s lost profit, though the extent of the understatement will vary from developer to developer, depending on the demand curve each faces. On the more realistic assumption that all developers face some competition, this quantity will overstate lost profits for developers that face strong competition, with the overstatement depending on the intensity of competition each faces.
194. Professor Economides does not discuss consumer surplus in this analysis, and it cannot be directly evaluated from Figure 3 since that Figure only shows prices received by the developer, net of different commission payments, not consumers’ willingness to pay for various quantities.³⁵³ One can show, however, that the gain in consumers surplus in Professor Economides’ highly simplified model can be roughly approximated by the area KBEL, marked by the red shaded rectangle in the figure above.³⁵⁴

³⁵¹ Economides Report, at ¶ 66.

³⁵² Economides Report, at ¶ 67.

³⁵³ Thus, Professor Economides is wrong to assert that p_3 in the Figure is “the willingness to pay for quantity q_2 in the but-for world.” It is rather the price the developer would receive if it sold q_2 in the but-for world.

³⁵⁴ An approximation to the change in consumer surplus is given by the actual quantity, q_2 , times the difference between the price consumers are charged in the actual world and the price they are charged in the but-for world. Let the but-for commission rate be c , a number between zero and one. The actual price consumers pay in the but-for world is then $p_1/(1-c)$. If the developer sold q_2 in the but-for world, it would receive p_3 per unit, which means that consumers would pay $p_3/(1-c)$ for q_2 units. This must be what they paid in the actual

195. However, given Professor Economides’ deposition testimony, his discussion in his report of Figure 3, his “conservative” and “defendant-friendly” assumptions shortcuts, and his suggestion that quantity and prices could be different in the but-for world appear irrelevant. Professor Economides’ opinion that developers would not lower price in the but-for world implies that the but-for world is not characterized by “price and quantity (p_1, q_1) at point A,” as presented in his report.³⁵⁵ Instead, Professor Economides’ deposition testimony suggests that developers actually choose price and quantity (p_3, q_2) at point B in the but-for world. In this but-for world developers have zero pass through and consumers receive zero benefits and therefore are not harmed.
196. Lastly, Professor Economides claims in a footnote of his report that his methodology to assess damages to developers takes into account indirect network effects between developers and consumers, but does not provide details on how he does so.³⁵⁶ His presentation suggests, incorrectly, that network effects operate at the level of individual developers rather than at the platform level. In his deposition, when asked to elaborate on the basis of this footnote, Professor Economides evaded the question by answering “I’m just covering my behind.”³⁵⁷

C. Professor McFadden³⁵⁸

197. Professor McFadden does not accept that the App Store is a two-sided transaction platform. He argues instead that the App Store is a retailer (distributor) selling iOS apps (and in-app

world for that quantity, since consumers’ demand curve is unaffected by the commission paid by developers. Thus, a rough approximation to the consumers’ surplus gain is $q_2(p_3 - p_1)/(1 - c)$. The smaller is c , the but-for commission, the closer this quantity is to the red shaded rectangle in the figure.

³⁵⁵ Economides Report, at ¶ 65.

³⁵⁶ Economides Report, at footnote 96.

³⁵⁷ Economides Deposition, at 250:21-251:20 (“Q. Now, you say in footnote 96 that, ‘This demand curve takes into account network effects between developers and their users.’ What’s the basis for that statement? A. It’s just making sure that nobody can say that this demand should be really different because it didn’t take into account the -- the network effects. So I’m just covering my behind [...] I’m just putting this footnote for completeness. I’m not trying to argue something additional.”).

³⁵⁸ Professor Prince presents a detailed discussion and critique of Professor McFadden’s econometric analysis. My concern here is with his assumptions and their implications. See Expert Report and Declaration of Jeff Prince, Ph.D., *In re Apple: iPhone Antitrust Litigation*, No. 4:11-cv-06714-YGR, United States District Court for the Northern District of California, Oakland Division, August 10, 2021.

purchases) to consumers.³⁵⁹ He treats the App Store’s commission rate as a percentage (ad valorem) tax on revenues the App Store levies on developers.³⁶⁰

198. Similar to Professor Economides, Professor McFadden’s but-for world relies on the assumption that increased competition would drive down the commission rate paid by all developers for every app that is currently available on the iOS App Store through all distribution channels, while all other aspects of the iOS App Store pricing would remain unchanged.³⁶¹ When asked at deposition how long it will take for the commission to be reduced, Professor McFadden testified that he has “no idea.”³⁶²
199. Professor McFadden also assumes that the but-for world commission rate applies uniformly throughout the consumer class period. Similarly, when asked at deposition about whether these assumptions are based on the factual observations of comparable platforms, Professor McFadden testified that his model is flexible and can accommodate alternative but-for world’s scenarios.³⁶³

³⁵⁹ McFadden Report, at ¶ 132.

³⁶⁰ McFadden Report, at ¶¶ 14, 132.

³⁶¹ Professor McFadden confirmed this view in his deposition. McFadden Deposition, at 112:4-12 (“Q. And -- and what -- what’s the first thing that’s happening in the but-for world, aside from prices, compared to the actual world? What’s different about the but-for world aside from pricing? A. In -- in the but-for world that I modeled, that is the only difference, I believe. I’m prepared to qualify my answer, but I don’t believe there’s any other difference.”).

³⁶² McFadden Deposition, at 151:1-13 (“Q. In the but-for world, how much time would it take before entry would lead Apple to charge the 10 to 12 percent but-for commission level that you use as a benchmark? [...] THE DEPONENT: I have -- I have no idea how -- I -- I would be, I think, a difficult calculation for -- for economists, so -- because it -- it -- it depends on the detailed evolution of the structure of the market, and that’s -- that’s much harder to predict than to predict that competitive pressures, in general, will operate on some timescale.”).

³⁶³ McFadden Deposition, at 152:22-153:15 (“Q. [...] How do you reconcile the fact that the commission reduction announced by the Microsoft Store that you cite is limited to game apps; while, in the but-for world, you would apply that rate to every app? [...] THE DEPONENT: In -- in my calculations, I -- I assume that the competitive pressure that would be applied to Apple -- to the Apple Store would -- would come from things like rival -- rival Apple Stores or other competitive pressures that would -- would apply across the genres. If -- if the -- an alternative but-for world was proposed in which that -- those competitive pressures would differ across genres, that could be built into the model. But sitting here as an economist, that’s -- that strikes me as being a -- a -- a secondary effect rather than -- rather than the common effect of Apple’s conduct.”) and 156:15-21 (“Q. Is there some reason why you would reject the possibility that there would, in the but-for world, be a tiered commission structure? A. I would not reject that possibility. I believe that, under competition, competition would tend to erode a tier structure -- well, leave it at that time.”).

200. Professor McFadden recognizes that a decrease in the commission rate in the but-for world would change developers’ price setting decisions and thus consumers’ demand for iOS apps.³⁶⁴ Professor McFadden argues that both consumers and developers would be damaged by the higher actual commission.³⁶⁵ To estimate the injuries to the two groups, he proceeds in two steps.
201. In the first step, he assumes that in the but-for world there will be a single uniform commission rate that will apply to all iOS transactions. To estimate that but-for rate, he considers four examples of transaction platforms selling gaming apps that have a commission rate below 30%.³⁶⁶ Among these examples of lower commission rates in transaction platforms, there does not appear to be one before December 2018 (i.e., more than 10 years after the beginning of the consumer class period).³⁶⁷ In addition, some of the examples that Professor McFadden presents in his report are examples of multi-tiered pricing providing discounts to large developers or discounts that targeted certain categories such as games rather than every app available on its platform.³⁶⁸ Professor McFadden chooses without comment simply to ignore these facts and the facts that different iOS apps face different commissions in the actual world, and he concludes that in the but-for world,

³⁶⁴ McFadden Report, at ¶ 148.

³⁶⁵ McFadden Report, at ¶¶ 149-150.

³⁶⁶ McFadden Report, at ¶¶ 156-160.

³⁶⁷ McFadden Report, at ¶¶ 156-160; McFadden Deposition, at 140:1-14 (“Q. For a benchmark to be reliable, is it important for the market to be comparable to the relevant market in question over the whole class period? A. To answer your question, I -- I would say that -- first of all, that the benchmarks that I have are -- are not -- do not extend over the entire class period. They are based on relatively recent -- relatively recent developments in which rival app stores have arisen, especially since about 2016; so that my whole analysis is predicated on the -- on the comparison of Apple commissions and these benchmarks in the latter part of the class period.”).

³⁶⁸ McFadden Report, at ¶¶ 157-158.

all apps, regardless of revenue or app type,³⁶⁹ would face a single commission rate between 10% and 12%.³⁷⁰

202. These two commission rates are not backed up by rigorous analysis and are arbitrary and unreliable. Professor McFadden conceded in his deposition that he did not consider any scientific bright line for picking an ideal benchmark; instead, he relied on “commonsense” judgment.³⁷¹ In particular, the 10% commission rate is based on a single firm, Discord,

³⁶⁹ As discussed in **Appendix D**, commission rates on the iOS App Store vary from 0 to 30%. The standard commission in the App store is 30% (see “App Store Features,” *Apple*, available at <https://developer.apple.com/app-store/features/>, accessed on July 29, 2021), however there are numerous exceptions. Starting in 2016, commissions charged on in-app subscriptions are reduced to 15% for subscriptions that extend beyond the first year; see Statt, Nick, “Google Matches Apple by Reducing Play Store Fee for Android App Subscriptions,” *The Verge*, October 19, 2017, available at <https://www.theverge.com/2017/10/19/16502152/google-play-store-android-apple-app-store-subscription-revenue-cut>. The Video Partner Program charges a 15% commission to developers offering “premium subscription video entertainment services”; see “Apple Video Partner Program,” *Apple* available at <https://developer.apple.com/programs/video-partner/>, accessed on July 22, 2021. Under the Small Business Program, developers with proceeds from all apps under \$1 Million are only charged a 15% commission; see “App Store Features,” *Apple*, available at <https://developer.apple.com/app-store/features/>, accessed on July 29, 2021. Under the multiplatform rule, content purchased on another platform may be consumed on an Apple platform without a commission if the content is available for purchase in the iOS app; see “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021 (“3.1.3(b) Multiplatform Services: Apps that operate across multiple platforms may allow users to access content, subscriptions, or features they have acquired in your app on other platforms or your web site, including consumable items in multi-platform games, provided those items are also available as in-app purchases within the app.”). The “reader” rule allows developers of magazine, newspaper, audio, music, and video apps to deliver subscription content to consumers without requiring the subscription to be offered within the App Store; see Foresman, Chris, “Apple quietly drops special subscription requirements for iOS apps,” *Ars Technica*, June 9, 2011, available at <https://arstechnica.com/gadgets/2011/06/apple-quietly-drops-special-subscription-requirements-for-ios-apps/>; “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021. Apple also charges no commission on the sale of physical goods or through revenue gained through in-app ads in iOS apps (see “Principles and Practices,” *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021). The Steam store charges a 30% commission but offers reduced rates for high revenue products. If sales exceed \$10 million, the commission drops to 25% and if sales exceed \$50 Million, the commission drops further to 20%; see Statt, Nick, “Valve’s new Steam revenue agreement gives more money to game developers,” *The Verge*, November 30, 2018, available at <https://www.theverge.com/2018/11/30/18120577/valve-steam-game-marketplace-revenue-split-new-rules-competition>. Starting in August 2021, the Microsoft store will reduce its 30% commission to 12% (McFadden Report, at ¶ 158). Lastly, the Epic Store, which opened in December 2018, charges a commission of 12%; see “About,” *Epic Games*, available at <https://www.epicgames.com/store/en-US/about>, accessed on August 4, 2021; McFadden Report, at ¶ 156.

³⁷⁰ McFadden Report, at ¶ 161. Professor McFadden’s profit function in Equation 1 shows a single commission rate τ that does not vary across apps or over time (see *id.*, at ¶ 170).

³⁷¹ McFadden Deposition, at 135:1-13 (“[Q.] My question is: How do you determine whether a benchmark market has similar characteristics? A. Well, I think it’s largely common sense. Are they dealing with economic agents that have rough -- roughly similar interests? Firms that have roughly similar technologies and -- and business models? You know, are the products, by a -- by a commonsense measure, somewhat

whose attempt to launch a front end gaming store only lasted a few months³⁷² after which it made changes that made purchasing a game from a developer a “significant [...] investment on the part of a potential customer.”³⁷³ Discord’s changes to the platform removed the front end of the store so that consumers could not find out about new games unless they specifically learned about them from other sources.³⁷⁴ Besides Discord, the 12% threshold that Professor McFadden cherry-picked as the upper bound of the but-for commission rate is the lowest commission rate of two out of the other three remaining platforms that he chose as a comparison to predict the but-for world commission rate.³⁷⁵ Among these comparators, only the Epic Game Store charges a 12% commission rate to all developers, with the Microsoft PC Store charging 12% only to some game developers and Steam charging a minimum commission fee of 20% to some developers. In light of this evidence, assuming that in the but-for world a 12% commission rate would apply to all developers as

similar? I don’t think there’s a -- there’s a scientific bright line which says that one benchmark is ideal, and -- and another one is unacceptable. It’s --it’s a commonsense judgment.”).

³⁷² McFadden Report, at ¶¶ 159-161; Futter, Mike, “Discord Nitro to drop subscription-based game library in October [Update],” *GameDaily.biz*, September 13, 2019, available at <https://gamedaily.biz/article/1212/discord-nitro-to-drop-subscription-based-game-library-in-october>.

³⁷³ Futter, Mike, “Discord Nitro to drop subscription-based game library in October [Update],” *GameDaily.biz*, September 13, 2019, available at <https://gamedaily.biz/article/1212/discord-nitro-to-drop-subscription-based-game-library-in-october> (“In order to purchase a game from a developer on Discord, a user must first join the publisher’s server. That alone requires a significant amount of investment on the part of a potential customer.”).

³⁷⁴ Futter, Mike, “Discord Nitro to drop subscription-based game library in October [Update],” *GameDaily.biz*, September 13, 2019, available at <https://gamedaily.biz/article/1212/discord-nitro-to-drop-subscription-based-game-library-in-october> (“While Discord’s decision to reinforce its verified pages fits the community-first ethos, removing the Store tab has left users and developers without a commerce hub. Discoverability relies on finding and learning about new things (what’s known as a push strategy). Discord’s commerce approach now relies on users pre-qualifying their interest in purchasing a game (a pull strategy). In order to purchase a game from a developer on Discord, a user must first join the publisher’s server. That alone requires a significant amount of investment on the part of a potential customer. In this format, no games are being surfaced to users, there’s nothing to browse, and discoverability is approaching zero.”).

³⁷⁵ Besides Discord, the three platforms are the Epic Games Store, Valve’s Steam, and the Microsoft Store for PCs (see McFadden Report, at ¶¶ 156-158). The Epic Games Store charges developers a 12 percent commission fee. Prior to January 1, 2015, Microsoft charged developers earning more than \$25,000 a 20% commission rate. Beginning in 2015, all developers were charged a 30% commission rate. Beginning in March 2019, non-game app purchases were charged a 15% commission rate. Microsoft announced game apps will be charged a 12% commission beginning in August 2021. Purchases made in the Microsoft Stores for Business, Education, and Windows 8 are still subject to a 30% commission rate. Until September 30, 2018, Valve’s Steam charged a flat 30 percent commission to all developers; starting October 1st 2018, Steam charges a commission rate that depends on the revenue from a game’s sales, and this commission ranges from 20 to 30 percent. See **Exhibit 4**.

Professor McFadden assumes in his methodology is unrealistic.^{376,377} Because of the absence of any analysis on the but-for commission rates, Professor McFadden is forced to make arbitrary assumption about the but-for commission rate that make his but-for world unreliable.

203. In the second step of his procedure to assess damages for consumers, Professor McFadden estimates consumers’ demand functions for each app, along with a structural model to assess how the profit maximizing pricing decision of developers would change given the but-for world commission rate computed in step one.³⁷⁸ To perform this second step, Professor McFadden has to rely on several arbitrary assumptions:

- i. Professor McFadden’s but-for world is static with a single commission rate that never changes during the consumer class period.
- ii. The commission rate is identical for all apps regardless of the developer size or the app category.
- iii. Every other aspect of Apple’s pricing policies in the but-for world is identical to the actual world.
- iv. All applications are monopolists that never face competition from other applications during the entire class period and would face no competition in the but-for world.
- v. There is no need to account for indirect network effects because the iOS App Store is not a two-sided transaction platform.

204. Professor McFadden’s demand estimation procedure recognizes heterogeneity across app categories: different app categories are allowed to have different demand functions. He does not consider the general implications of that heterogeneity for market definition, though he did note in his deposition that “game markets are a -- a distinct market for some

³⁷⁶ McFadden Report, at ¶¶ 157-161.

³⁷⁷ See **Exhibit 4** for the commission rates charged by the Epic Games Store, Valve’s Steam, and the Microsoft Store for PCs.

³⁷⁸ McFadden Report, at Sections VI.D and VI.E.

purposes.”³⁷⁹ He simply assumes that the categories chosen by app developers for their apps define relatively homogeneous aggregates. His treatment of all game transactions as fundamentally alike is consistent with Apple’s position that game transactions are a distinct relevant antitrust market.³⁸⁰ At the same time, Professor McFadden imposes that all apps within a single app category have the same price sensitivity. Essentially, this approach prevents him from estimating individual effects that may be driven by an app’s popularity within its category and forces a common effect on every app within each category. Professor McFadden admitted so during his deposition.³⁸¹

205. Professor McFadden believes that in the but-for world “there could be app stores specialized in certain categories, e.g., games and music, helping iOS device consumers find apps they need.”³⁸² It is unclear how he reconciles this aspect of his but-for world, with two-sided platforms that specialize in specific categories, with his assumption that all apps would be charged a single commission rate throughout the consumer class period.
206. Professor McFadden assumes, implausibly, that downloads of a particular app in a specific year only affect in-app purchases in that year. Moreover, according to his model of consumers’ demand, if the price of a particular app is unchanged, the demand for that app will not be affected by any changes in the prices of any other apps in the same category.³⁸³

³⁷⁹ McFadden Deposition, at 69:9-15 (“[I]f for other economic purposes you want to define the market narrowly to limit it to close substitutes, then -- then sub- -- submarkets may -- may be important for that purpose. So it may be that -- that game -- game markets are a -- a distinct market for some purposes.”) and 55:9-56:2 (“Q. Do you, in this case, define a market that encompasses different products grouped together? A. I would -- I would say, yes, I do. And as -- as is -- as is standard, that is to say, when one -- when one talks about defining a market where products are -- are differentiated in any way, the -- the critical question is where -- where -- where does the differentiation matter enough so that they’re not easy substitutes, so they’re really distinct markets [...] And that -- that’s a -- that’s an empirical practical distinction. Of course, it -- it matters in cases like this.”).

³⁸⁰ See, e.g., Lafontaine Written Direct Testimony, at ¶ 34 (“[T]he appropriate economic analysis in the present case must focus on game app transactions.”).

³⁸¹ McFadden Deposition, at 129:10-20 (“Q. Would your model allow those two game apps to have elasticities of demand that vary, you know, as between the two, substantially? A. The analysis that I do currently looks for the common effect of, you know, profit-maximizing pricing behavior on -- within the genre and how that would respond to a change in Apple commissions. So it’s looking for the common -- common effect. It’s -- it’s not distinguishing individual variations around that common effect.”).

³⁸² McFadden Report, at ¶ 243.

³⁸³ McFadden Report, at Section VI.D.2.

207. As noted above, Professor McFadden’s demand models embody the implausible assumption that demand for downloading an app or purchasing in-app content depends only on the price of that app and of that content – no other prices matter, including prices of apps and in-app content offered by the same developer. Not only is this inconsistent with profit maximization by multi-app developers, it assumes that developers do not face competition from other developers. Like Professor Economides, Professor McFadden assumes each developer of a single application is a monopolist. Thus, even though he concludes that developers would change prices in the but-for world, his model implies that changes in the prices of similar apps do not impact developers’ price-setting decisions.
208. Even though Professor McFadden recognizes that different app developers have different monetization strategies and that many apps rely solely on advertising revenues, in his model developers cannot choose to rely on advertising revenues and must earn a profit through paid apps or in-app purchases.³⁸⁴ His model cannot capture developers’ complex choice among several monetization strategies.³⁸⁵ Instead of properly specifying the profit function of developers to include choice of reliance on advertising, Professor McFadden simply treats the actual revenue developers receive from in-app advertising (on which he has no data) as a “negative cost.”³⁸⁶ This choice has consequences and is at the heart of another issue with Professor McFadden’s model.
209. As Professor McFadden himself admits, this causes him to estimate that some developers have negative variable cost.³⁸⁷ Professor McFadden also admits that his model implies that, even with lower commission rates, some prices that developers would charge to consumers

³⁸⁴ McFadden Report, at ¶ 170.

³⁸⁵ McFadden Report, at ¶ 170 and footnote 245.

³⁸⁶ McFadden Report, at ¶ 225. It is worth noting that some iOS developers apparently earn revenue by selling data about their customers. *See* Lyles, Taylor, “Los Angeles settles Weather Channel lawsuit, lets it keep selling location data to advertisers,” *The Verge*, August 19, 2020, available at <https://www.theverge.com/2020/8/19/21376217/los-angeles-the-weather-channel-app-lawsuit-settlement-location-data-selling> (“The city filed litigation against the company in 2019, alleging that the app misled millions of people into granting access to their personal location data and sold that data to third parties. [...] [I]t sounds like they were largely true — since the only thing the settlement requires is for The Weather Channel to proactively warn users that yes, your location data is for sale.”). I have seen no estimates of the importance of these revenues, however.

³⁸⁷ McFadden Report, at ¶¶ 170, 240, and footnote 245.

would be higher in the but-for world than they are in the actual world.³⁸⁸ As Professor Willig demonstrates, for apps that rely heavily on advertising, so that their marginal costs are effectively negative, the profit-maximizing response to lower commissions is to *raise* the price of the app.³⁸⁹ Customers of such apps would be worse off in plaintiffs’ but-for world.

210. Professor McFadden does not consider systematic cost differences between app and in-app purchases. Making an in-app purchase often amounts to paying to unlock features already present in the previously downloaded app.³⁹⁰ The only potentially positive component of marginal cost is then customer acquisition cost, which may have been incurred long before an already-acquired customer makes an in-app purchase and is thus at best loosely related to that purchase.³⁹¹ It is accordingly not unreasonable for developers to treat the marginal cost of in-app purchases, like the purchase of V-Bucks for Epic’s Fortnite game as zero, which Epic Games apparently does.³⁹² If the marginal cost of an in-app purchase is treated as zero, as it may be in many cases, the profit-maximizing price is independent of the commission rate: the price that maximizes revenue also maximizes 70% of revenue. This implies that a significant fraction of the [REDACTED] of proposed class consumer accounts that

³⁸⁸ McFadden Report, at ¶ 240 (“I note that there are a relatively small number of apps for which either download or IAP prices are estimated to increase somewhat in the But-For world.”). Professor McFadden argues that this result is caused by some developers setting as-is prices to be “too low” for the estimated price elasticities given that their variable cost estimates are “negative as they include omitted revenues.”

³⁸⁹ Willig Report, at ¶¶ 230-231.

³⁹⁰ “The App Store Turns 10,” *Apple*, July 5, 2018, available at <https://www.apple.com/newsroom/2018/07/appstore-turns-10/> (“With the introduction of in-app purchase (IAP) in 2009, customers could download an app and then pay to unlock different levels and functionality[.]”).

³⁹¹ Bresnahan, Timothy, Jason P. Davis, and Pai-Ling Yin, “Economic Value Creation in Mobile Applications,” *In The Changing Frontier: Rethinking Science and Innovation Policy*, National Bureau of Economic Research, Inc., 2015, pp. 233–286, at p. 253 (“This can lead to the irony, (now) frequently noted by industry observers, of an app that plans to be supported by advertising in the future but spends on mobile advertising today to get more downloads despite zero revenue.”).

³⁹² See Trial Testimony of Timothy Sweeney, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, United States District Court for the Northern District of California, Oakland Division, May 3, 2021, at 190:12-16 (“Q. What does it cost to Epic to generate a V-Buck, minting a V-Buck? A. There is no cost to a V-Buck. There’s cost in developing the software, but the V-Bucks themselves don’t have a marginal cost.”).

made only in-app purchases would not have paid lower prices as a consequence of lower commission rates in the but-for world.³⁹³

211. Professor McFadden argues that Apple’s .99 tiered pricing limits competition and is therefore anticompetitive, but performs no analysis beyond claiming that price tiers “interfere with app developers’ ability to compete” and that “restricted pricing policies [...] limit[] the force of competition to drive down prices.”³⁹⁴ Professor McFadden argues that Apple would simply drop this restriction in the but-for world because it “would have difficulty retaining or attracting app developers with such policies in place in the competitive But-For world.”³⁹⁵ What Professor McFadden ignores is that, in the actual world, 99 is a common focal price ending in many industries, and research indicates that it is the most common price ending.³⁹⁶ Even though Google Play does not impose the same .99 tiered pricing, for instance, of Google Play’s top 100 paid apps, 83 have prices ending in .99.³⁹⁷ Of the top 100 paid apps on Steam, Amazon App Store, and Microsoft Store, at least 85, 90, and 75 respectively have prices ending in .99, even though none of these stores impose the .99 tiered pricing.³⁹⁸ If the .99 tiered pricing limited developers’ ability to compete, one would not expect prices ending in .99 to be as ubiquitous as they are when no such tiered pricing is in place.

³⁹³ Hitt Class Report, at ¶ 73. Of all consumer accounts that downloaded an app or made a digital in-app purchase, █ percent have made no paid transactions. Of the █ percent that have made a paid transaction and are in the proposed consumer class, █ percent have only made in-app purchases.

³⁹⁴ McFadden Report, at ¶¶ 128-129, 162.

³⁹⁵ McFadden Report, at ¶ 162.

³⁹⁶ Schindler, Robert M., “The 99 price ending as a signal of a low-price appeal,” *Journal of Retailing*, 82(1), 2006, pp. 71-77, at pp. 74-75 (“[T]he products advertised were grouped into three broad categories: general merchandise (e.g., clothing, electronics, household goods [...]), services (e.g., travel, dining, entertainment [...]), and automotive items (e.g., new and used cars, accessories[...]) [...] .99 was the most common price ending (42.9 percent of the prices).”).

³⁹⁷ “Top Paid Apps,” *Google Play Store*, available at https://play.google.com/store/apps/collection/cluster?clp=0g4jCiEKG3RvcHNlbGxpbmdfcGFpZF9BUFBMSUNBVEIPTAhGAM%3D:S:ANO1ljLdnoU&gsr=CibSDiMKIQobdG9wc2VsbGluZ19wYWlkX0FQUExJQ0FUSU9OEAcYAw%3D%3D:S:ANO1ljIKVpg&hl=en_US&gl=US, accessed on July 15, 2021.

³⁹⁸ “Steam Search,” *Steam*, available at <https://store.steampowered.com/search/?filter=topsellers>, accessed on July 16, 2021; “Amazon Best Sellers: Best Apps and Games,” *Amazon*, available at https://www.amazon.com/Best-Sellers-Appstore-Android/zgbs/mobile-apps/ref=zg_bs_pg_1?_encoding=UTF8&pg=1, accessed on July 16, 2021; “Top paid apps - Microsoft Store,” *Microsoft*, available at <https://www.microsoft.com/en-us/store/top-paid/apps/pc?s=store&skipitems=0>, accessed on July 16, 2021.

212. In order to assess whether the .99 tiered pricing is anticompetitive, one must evaluate whether it resulted in supra-competitive prices and reduced output relative to that in the but-for world. A priori it is not obvious that price tiers result in higher prices and that they reduce output. In fact, if a .99 price tier is a binding constraint it may act as a ceiling rather than as a floor, depending on particular circumstances. For example, a developer whose optimal price absent a price tier requirement is \$1.25 may find it more profitable to lower its price to \$0.99 rather than jump to the next tier of \$1.99. Furthermore, there are numerous studies in behavioral economics that suggest that pricing in \$0.99 increments, and prices ending in 9 in general, results in lower perceived prices among consumers and increased spending.³⁹⁹ Professor McFadden did not perform any empirical analysis to evaluate the effect of the tiered pricing on prices and output. His model does not separately identify the effects of each element of the App Store’s at-issue conduct, nor does it address the question of whether the pricing tier policy on balance results in supra-competitive prices and lower output.⁴⁰⁰ In fact, when asked about these considerations in his deposition, Professor McFadden admitted that, because the goal for his model is to measure a common impact, he considers accounting for the behavioral preferences of consumers that may lead developers to price their app at \$0.99 rather than a \$1 or \$0.96 as a misleading deviation

³⁹⁹ Thomas, Manoj and Vicki Morwitz, “Penny Wise and Pound Foolish: The Left-Digit Effect in Price Cognition,” *Journal of Consumer Research*, 32, June 2005, pp. 54-64, at p. 54 (“Through five experiments, we provide a cognitive account of when and why nine-ending prices are perceived to be smaller than a price one cent higher. First, this occurs only when the leftmost digits of the prices differ (e.g., \$2.99 vs. \$3.00).”); Schindler, Robert M., “The 99 price ending as a signal of a low-price appeal,” *Journal of Retailing*, 82(1), 2006, pp. 71-77, at p. 76, (“Consumers’ repeated exposure to this salient advertising leads to their learning to associate 99 endings and ostensible low prices.”); Anderson, Eric T. and Duncan I. Simester, “Effects of \$9 Price Endings on Retail Sales: Evidence from Field Experiments” *Quantitative Marketing and Economics*, 1, 2003, pp. 93–110, at p. 93 (“First, use of a \$9 price ending increased demand in all three experiments.”).

⁴⁰⁰ McFadden Deposition, at 123:18-124:12 (“Q. And how would you assess whether vertical price fixing was inherently anticompetitive? [...] THE DEPONENT: Well, I haven’t laid out a -- a research plan for -- for doing that, and I would certainly have to think about the -- the detailed steps, but the -- an obvious approach would be to try to compare markets otherwise comparable, one of which has a resale price maintenance or -- or a tier structure in place versus one that does not. Q. [...] Are you modeling the absence of Apple’s tier structure in the but-for world because you are assuming it will be absent because it’s anticompetitive? A. The -- the answer to that is that the model that I have worked out and provided results for so far is -- is -- gives a but-for world in which both the plaintiffs alleged anticompetitive acts are gone.”) and 125:1-6 (“Q. Do you have an opinion as to whether Apple’s price tiers ever result in developer setting prices lower than they otherwise would in the real world? A. I haven’t analyzed that question specifically.”).

from the purpose of the model.⁴⁰¹ In summary, I have seen no economic evidence to suggest that the App Store’s price tiering policy is anticompetitive.

213. Professor McFadden performs two distinct estimation procedures to compute separate measures of harm for gaming apps and apps for music and entertainment. For gaming apps, he finds that “the consumer class bore █████ percent of the burden of the App Store commission from the Games category, while app developers bore the remaining █████ percent of the burden.”⁴⁰² He finds nearly identical results for apps in the music and entertainment categories.⁴⁰³

214. Professor McFadden’s approach to estimate the number of uninjured consumer class members is deeply flawed. In his report, Professor McFadden claims that “approximately 5.8 percent of the Consumer Class members spent money on only those apps and in-app content items whose But-For prices are higher at the 12 percent But-For commission rate”⁴⁰⁴ From this calculation, he erroneously concludes that 5.8 percent of consumers are “uninjured.”⁴⁰⁵ However, 5.8 percent is a lower bound of the number of unharmed consumer because to compute this number under his assumptions one needs to take into account, for each consumer, the net impact of all differences between the actual and but-for worlds. If a consumer made *any* purchases that would have been more expensive in the but-for world, she would be uninjured if those actual-world losses outweighed gains on other transactions. In his deposition, Professor McFadden agreed that this would be the correct approach to compute the share of consumers that have not been harmed and that he

⁴⁰¹ McFadden Deposition, at 180:9-181:6 (“Q. [...] Does your model, which assumes there are no price tiers in the but-for world, take account of the likelihood that consumers will more likely choose a 99-cent price than a even one-dollar price? [...] THE DEPONENT: The answer is: No, the model does not take that into account.[...] in my opinion, with some experience in both consumer work and -- and behavioral economics, that these -- the phenomena are -- as they exist, are very -- are very hard to systematize and quantify so that I think that there would be a misleading deviation from the purpose of the model, which is to find a common effect.”).

⁴⁰² McFadden Report, at ¶ 235.

⁴⁰³ McFadden Report, at ¶ 238.

⁴⁰⁴ McFadden Report, at ¶ 241.

⁴⁰⁵ McFadden Report, at ¶ 241.

did not recall what this share is based on his but-for world prices.⁴⁰⁶ Nonetheless, Professor McFadden argues that he did take into account net harm when computing damages.⁴⁰⁷ This claim is also wrong. Following the necessary principles to compute net harm requires computing the net prices paid in the but-for world by all individual consumers across all app categories, which is something that Professor McFadden did not do, as his analysis focuses only a narrow set of app categories, Games, Entertainment, and Music.⁴⁰⁸ Because of this omission, it is possible that some consumers that are harmed in these three app categories would not be harmed once the but-for world prices in the remaining app categories are computed.

D. Plaintiffs’ Experts Analyses Contradict Each Other

215. Professor Elhauge, Professor Economides, and Professor McFadden have starkly different approaches to assessing injury and measuring damages and obtain dramatically inconsistent results. As a matter of pure logic, they cannot all be right. **Table 1** summarizes, at a high level, some of the key differences and contradictions in Developer and Consumer Plaintiffs’ experts’ opinions.

⁴⁰⁶ McFadden Deposition, at 208:10-209:19 (“Q. And in paragraph 241, you say -- you estimate that ‘approximately 5.8 percent of the Consumer Class members spent money on only those apps and in-app content items whose But-For prices are higher at the 12 percent But-For commission rate.’ That does not indicate that you carried out a net impact analysis, does it? A. For -- for the sentence, as stated, that’s correct. [...] Q. (By Mr. Swanson) And have you estimated what approximate percentage of the consumer class members, based on a netting methodology, would have been uninjured? A. I don’t -- I believe that has been estimated, and my -- my recollection is that that number is -- is, in fact, small also. But I don’t recall this specific calculation.”).

⁴⁰⁷ McFadden Deposition, at 209:12-22 (“Q. [...] And have you estimated what approximate percentage of the consumer class members, based on a netting methodology, would have been uninjured? A. I don’t -- I believe that has been estimated, and my -- my recollection is that that number is -- is, in fact, small also. But I don’t recall this specific calculation. I -- I do believe that when I compute damages, I -- I do the netting entirely in the damage calculation.”).

⁴⁰⁸ McFadden Report, at ¶ 229.

Table 1
Key Differences in Developer and Consumer Plaintiffs’ Experts’ Opinions

Topic	Elhauge	Economides	McFadden
App Store’s commission rate	Two tiers	Two tiers	Single rate
But-for average commission rate	N/A	Tier 1: 13.5-15.6% Tier 2: 6.8-9%	10-12%
Varying commission rates across stores	Yes	No	No
Developers’ marginal costs	Low	Low	High
Pass-through	None	None	Substantial
Change in app prices	No	No	Yes
Change in output	Yes	No	Yes
Distinguishing harm between developers and consumers	Irrelevant	Irrelevant	Important
Heterogeneity across app categories	Irrelevant	Irrelevant	Important
Foreign developers included harm calculations	N/A	No	Yes
App Store is a two-sided transaction platform	Yes	Yes	No
Existence of submarkets in iOS app distribution	No	N/A	Potentially

216. Plaintiffs’ experts have contradicting views of commissions in the but-for world. Professor McFadden assumes that in the but-for world all apps will pay the same commission rate,⁴⁰⁹

⁴⁰⁹ McFadden Deposition, at 156:8-14 (“Q. (By Mr. Swanson) Professor, in your but-for world, do you assume that there will be a single uniform commission rate? A. Yes, the but-for calculation that I do uses one of these rates here, hovering in the 10 to 12 percent range or the two extremes, and seems that’s uniform.”).

while Professor Economides, relying on Professor Elhauge, argues that in the but-for world Apple will adopt a two-tiered commission structure.⁴¹⁰

217. Professor McFadden and Professor Economides disagree on what the but-for average commission rates will be. Professor McFadden argues that the single but-for commission rate will be between 10 and 12 percent and performs sensitivities using commission rates of 5.2 and 15 percent, respectively.⁴¹¹ Professor Economides, on the other hand, proposes two commission rates (Tier 1 and Tier 2), with each but-for commission rate taking on one of six proposed values based on the yardstick commission rates and the two-tier commission rates. For Tier 1, the but-for commission rate goes from a maximum of 15.6 percent to a minimum of 13.5 percent. For Tier 2, the but-for commission rate goes from a maximum of 9 percent to a minimum of 6.8 percent.⁴¹²

218. Professor Elhauge argues that third-party iOS app stores in the but-for world would be vertically differentiated and would likely have varying commission rates.⁴¹³ Professor Economides, who relies on Professor Elhauge’s methodology for determining common impact, instead believes that rival iOS app distributors in the but-for world would charge similar, if not the same, commission rates, and that Apple would likely match them.⁴¹⁴ In

⁴¹⁰ Economides Report, at ¶ 57 (“As Prof. Elhauge has shown, it is likely that Apple would also charge a two-tiered price in the but-for world”).

⁴¹¹ McFadden Report, at ¶ 161 and Appendix E.4.

⁴¹² Economides Report, at ¶ 61 and Table 7. For Tier 1, the but-for commission rate proposed is one of these six values: 15.6, 15.4, 15.2, 15.1, 13.7, or 13.5 percent, respectively. For Tier 2, the but-for commission rate proposed is one of these six values: 9.0, 8.9, 8.2, 7.8, 7.6, or 6.8 percent, respectively.

⁴¹³ Elhauge Report, at ¶ 326 (“Vertical Product Differentiation in iOS App Distribution Market in the But-For World Would Have Caused Profit-Maximizing Commissions to Vary Across Firms.”); Elhauge Deposition, at 257:18-258:7 (“Q. Based on economic logic and the evidence in this case, would it be correct, in your opinion, to assume that all firms in the iOS app distribution market in the but-for world would charge the same commission rate to developers? A. No. Q. And why not? A. Well, I think probably the reason I talk about the oligopoly pricing is hard to maintain in this market because the products are very differentiated -- the distributors are differentiated and a lot of the pricing is not transparent. And, in fact, in other competitive markets for app distribution, we don’t see, you know, parallel pricing.”).

⁴¹⁴ Economides Report, at ¶ 51 (“I additionally assume that all firms in the market would charge the same commission rate to developers.”); Economides Deposition, at 227:18-228:11 (“Q. Do you agree that it is unlikely that all the rival iOS app distributors in the but-for world would decide to charge the same commission because there would be significant variation in the different firms individually profit-maximizing commissions? A. Well, I don’t quite see that -- that being the -- the case. Here I assume that two entrants come in. They’re identical entrants. There is -- whatever their profit maximization is going to be is going to be very similar between these two companies. I’m not saying it’s going to be similar to Apple, I’m saying it’s

fact, when asked in his deposition whether he agreed with statements in Professor Elhauge’s report regarding variation in rival iOS app store’s commission rates, he explicitly disagreed.⁴¹⁵ Professor McFadden, meanwhile, assumes a single commission rate with no tier structure across all iOS app stores.⁴¹⁶

219. Plaintiffs’ experts disagree on the size of developers’ marginal costs. Professor McFadden contends that developers’ marginal costs are substantial, even for in-app purchases that only involve unlocking previously downloaded content.⁴¹⁷ In his deposition he asserted that “marginal costs for iOS apps [...] are significant costs for developers in [...] in relationship to the revenue they receive.”⁴¹⁸ In contrast, Professor Elhauge and Professor Economides explicitly disagree with Professor McFadden and claim that developers’ marginal costs for app downloads and in-app purchases are “very small.”⁴¹⁹

going to be similar between these two companies, and that would create the same rate for them. At the same time, it makes sense for Apple to also accept the same rate because there’s going to be competitive pressure.”).

- ⁴¹⁵ Economides Deposition, at 228:17-229:22 (“Q. And just to be clear, you do not agree that there would be a significant variation in the different entrant firms individually profit-maximizing commissions in the but-for world? [...] THE DEPONENT: Well, I -- I think I already answered that firms that are very similar in terms of their cost conditions, their abilities and so on, are going to behave very, very similarly. [...] Q. (By Mr. Swanson) Well, do you disagree that Apple and its rival iOS app distributors in the but-for world would have varying profit-maximizing commissions because their products would be vertically differentiated and they would likely have different business strategies? [...] THE DEPONENT: Well, that’s -- that’s assuming a lot. Well, first of all, you assume they’re vertical differentiated. I’m not so sure. Why would they be necessarily vertically differentiated? And then you say they’re going to have different profit strategies. Why? I mean, even if you say that Apple has a different profit strategy than the entrants, it’s very hard to argue that the two entrants, which are very similar, are going to have different strategies from each other.”).
- ⁴¹⁶ McFadden Deposition, at 156:8-14 (“Q. (By Mr. Swanson) Professor, in your but-for world, do you assume that there will be a single uniform commission rate? A. Yes, the but-for calculation that I do uses one of these rates here, hovering in the 10 to 12 percent range or the two extremes, and seems that’s uniform.”).
- ⁴¹⁷ Professor McFadden’s mean marginal cost estimates for in-app purchases in free downloads are \$8.32 for game transactions and \$4.07 for music and entertainment transactions. *See* McFadden Report, Appendix E.3, Figure 28 and 29.
- ⁴¹⁸ McFadden Deposition, at 236:22-237:8 (“Q. It also is [Professor Elhauge’s] opinion that developers have low marginal costs. Do you agree with that? [...] THE DEPONENT: [...] And they are -- they are significant costs for developers in -- in relationship to the revenues that they can receive. That -- that said, I -- I wouldn’t disagree they -- that they are small.”).
- ⁴¹⁹ Economides Deposition, at 249:25-250:3 (“THE DEPONENT: I’m not sure if -- how much [Professor McFadden] disagree with me. I mean, I think he -- he thinks that marginal costs is -- is high. I do not agree with him that that’s the case.”); Elhauge Deposition, at 40:9-12 (“Q. (By Mr. Swanson) Is it your opinion personally that marginal costs for Apple developers are very small? A. Yes, generally, yes.”) and 246:18-21 (“[T]he pass-through is going to be proportional to the marginal costs, which are very low in this particular industry.”).

220. Plaintiffs’ experts disagree on the extent of pass-through from developers to consumers and, as a result, also disagree on whether prices paid by consumers would change in the but-for world. Professor McFadden finds substantial pass-through of the cost savings he assumes in the but-for world, and he concludes that consumers bore over 80% of the damages in the two categories he examined.⁴²⁰ In stark contrast, Professor Elhauge and Professor Economides claim that no pass-through would occur and prices paid by consumers would not change, in part due to their assumption that developers have low marginal costs.⁴²¹ Professor Economides explicitly stated in his deposition that Apple’s conduct has not restricted output and thus has produced no antitrust injury,⁴²² and his damage calculations imply that consumers suffered no injury.⁴²³
221. Professor Elhauge argues that in the but-for world iOS app development would be more attractive, and there would be more iOS apps on the market as a result.⁴²⁴ In this view reduced entry would be the anticompetitive effect of the App Store’s conduct. The existence of more apps would presumably benefit consumers, but the entry of new app developers would reduce the profits of developer class members. While new entry might be plausible under some assumptions about the but-for world, neither Professor Elhauge nor

⁴²⁰ McFadden Report, at ¶¶ 235, 238.

⁴²¹ Elhauge Deposition, at 245:24-246:25 (“Q. If there was an increase in the commission charged to app developers, in your opinion, would that lead some developers to raise the price of apps and in-app products? A. ...[I]f you wanted to ask me, do I also think they’re likely to pass it on, no, for the reasons I mentioned before [...] the -- the pass-through is going to be proportional to the marginal costs, which are very low in this particular industry. So it would be a low percentage pass-through. And when you combine that with the pricing tier, my opinion is they’re very unlikely to pass it through.”); Economides Deposition, at 239:13-19 (“Additionally, if you look carefully at the calculations I have done, if the marginal cost is small, if it’s zero, or if it’s small, the -- there is no incentive whatsoever for any developer to cut his price. That is, the price that he would sell in the but-for world is exactly the same as the price he would sell in the actual world.”).

⁴²² Economides Deposition, at 245:15-246:13 (“Q. (By Mr. Swanson) Professor, is it your opinion that output in the but-for world will be higher in the relevant market than in the actual world? A. [...] [M]ost likely, we are going to be with the same quantity in the but-for world as now. [...] Q. Is that your opinion at the level of the market? [...] THE DEPONENT: That’s correct. And individually as well.”).

⁴²³ Economides Report, at ¶¶ 64-67 (“However, conservatively, I calculate damages assuming that developers would not change their prices.”). If consumers have the same apps available in the but-for world at the same prices, they have not been injured.

⁴²⁴ Elhauge Report, at ¶ 440 (“By anticompetitively inflating the commission charged to developers in the iOS app distribution market, Apple’s conduct harmed iOS device users by reducing the number and quality of iOS apps and in-app content.”); Elhauge Deposition, at 288:4-10 (“Q. [...] [I]n your opinion, would there be more output in the but-for world? A. Yes. I think that with lower commissions there would be more investments in apps and, thus, a greater quantity of apps made and distributed in the iOS app market.”).

Professor Economides—nor, for that matter, Professor McFadden—has attempted to model entry in the but-for world, let alone to demonstrate how its effects on consumer and developer class members could be assessed.

222. In his deposition, Professor Elhauge seemed to misunderstand the implications of pass-through or Professor McFadden’s results, or both. He claimed that Professor McFadden agreed with him that there would be little pass-through,⁴²⁵ from which it would follow that app prices would not generally be lower in the but-for world,⁴²⁶ even though, as just noted, Professor McFadden in fact found substantial pass-through.

223. Plaintiffs’ experts also disagree on whether output would change in the but-for world. Professor Economides explicitly stated in his deposition that he did not think that output would be higher in the but-for world partly because prices would not change.⁴²⁷ Despite also believing that prices would not change in the but-for world, Professor Elhauge claims that output would increase.⁴²⁸ In contrast, Professor McFadden believes prices would change, and because the quantity of apps downloaded depends on the price of the app in his

⁴²⁵ Elhauge Deposition, at 39:4-6. (“Professor McFadden’s opinions coincided with my own about some aspects about the -- the likely small size of any pass-through that might occur.”).

⁴²⁶ Elhauge Deposition, at 42:20-25 (“Q. (By Mr. Swanson) If pass-through is very unlikely, does that imply that in the but-for world, app prices are unlikely to change? [...] THE DEPONENT: Yes. I think app prices are unlikely to change in the but-for world”) and 250:20-251:5 (“Q. (By Mr. Swanson) So in your view, consumers have less choice in the but-for world, but all prices are essentially the same for all the same apps and in-app products; is that correct? [...] THE DEPONENT: I -- I -- I think almost all prices for apps would be the same. But the quality would be adversely affected because the developers are lowering -- again, it’s lower rate of return on the apps and that that’s an injury to the consumers as well.”).

⁴²⁷ Economides Deposition, at 245:15-246:13 (“Q. (By Mr. Swanson) Professor, is it your opinion that output in the but-for world will be higher in the relevant market than in the actual world? A. Let me try to answer that. Whether that is the case will depend on whether a particular developer has a high marginal cost and is able to cut price and can sell more and has a guarantee that he would sell more and that the price cut that he does fit the 99 cent tiers. So these are three different conditions which, in my opinion, are unlikely to be met. Q. Okay. A. Therefore, most likely, we are going to be with the same quantity in the but-for world as now. Q. And that’s true at the level of the market? A. I’m sorry? Q. Is that your opinion at the level of the market? [...] THE DEPONENT: That’s correct. And individually as well.”).

⁴²⁸ Elhauge Report, at ¶ 441 (“Anticompetitively inflating Apple’s commission therefore reduced the number and quality of apps and in-app content on the iOS app store.”); Elhauge Deposition, at 288:4-10 (“Q. (By Mr. Swanson) In -- in -- in your opinion, would there be more output in the but-for world? A. Yes. I think that with lower commissions there would be more investments in apps and, thus, a greater quantity of apps made and distributed in the iOS app market.”).

model, it follows that quantity would change in Professor McFadden’s but-for world as well.⁴²⁹

224. Professor McFadden and Professor Economides disagree on whether distinguishing between harm to developers and consumers is necessary. Professor McFadden contends that to compute harm in this matter one must distinguish between harm to consumers and developers. To do this, he argues, it is necessary to take into account changes to developers’ prices and consumers’ demands in the but-for world. On the other hand, by concluding that prices and output would not change in the but-for world, Professor Economides’ implies that consumers have not been harmed.⁴³⁰ In fact, as noted above, Professor Economides’ illustration of damages to developers includes the bulk of what Professor McFadden would argue is damages to consumers. Professor Elhauge, who does not calculate harm to class members, arbitrarily claims that division of harm is irrelevant as “it’s still 100 percent injury to everybody.”⁴³¹

225. Professor McFadden believes that it is important to take into account heterogeneity in competitive conditions across app categories when modeling consumers’ demand for them.⁴³² Professor Economides disagrees and does not consider heterogeneity across app

⁴²⁹ McFadden Deposition, at 161:2-5 (“Q. In Equation 8, does the quantity of apps downloaded depend on the price of the -- of the app? A. Of the download, yes.”).

⁴³⁰ Economides Deposition, at 245:15-246:5 (“Q. (By Mr. Swanson) Professor, is it your opinion that output in the but-for world will be higher in the relevant market than in the actual world? A. [...] [M]ost likely, we are going to be with the same quantity in the but-for world as now.”).

⁴³¹ Elhauge Deposition, at 249:7-19 (“[W]hatever you assume about the pass-through rate, anything from zero to 100 percent, you know, the whole range of possibilities, it’s still 100 percent injury to everybody. And Professor Economides still has a conservative measure of the amount of damages to everybody. But if you want me to answer the question even though it’s irrelevant to classify damage -- injuries and the minimum amount of damages, I would say very few class members would pass on some of this, given the combination of percentage-based commissions, low marginal costs and these pricing tiers.”).

⁴³² McFadden Report, at ¶ 210 (“I make one modification in the regression equations for consumer demand for apps and IAPs. Rather than letting all apps and IAP items have the same coefficients, I let apps that belong to different app categories have different coefficients[.]”); McFadden Deposition, at 55:1-8 (“But I recognize that certainly different app genres are accessed for different reasons by consumers and are treated in the App Store and by developers as being somewhat separate kinds of beasts. And so that if one--I suppose for some purpose one might say, for example, talk about the submarket for game apps, iOS game apps.”).

categories, even though in his deposition he admitted that developers may face different demand elasticities.⁴³³

226. Professor McFadden and Professor Economides disagree on which developers are injured in this matter and therefore on the transactions that should be included when computing harm. Specifically, Professor McFadden argues that every transaction on the US storefront, including those by foreign developers, should be included.⁴³⁴ On the contrary, Professor Economides excludes foreign developers’ transactions involving US customers in his calculations.⁴³⁵
227. As I have discussed above in **Section III**, plaintiffs’ experts disagree on whether the App Store is a two-sided transaction platform, and this disagreement was reiterated during depositions.⁴³⁶
228. As I have also discussed above in **Section IV.A**, on the subject of market definition, plaintiffs’ experts disagree on whether there are submarkets within the iOS app distribution market they assume. Professor Elhauge claims that the iOS app distribution market he defines does not have submarkets and does not group together non-substitute app transactions.⁴³⁷ By contrast, in his deposition Professor McFadden conceded that

⁴³³ Economides Deposition, at 187:1-3 (“I wouldn’t -- I have not separated the developers in different categories.”) and 270:6-9 (“The developers may have found it optimal to charge a lower price. They might even have found it optimal to charge a higher price, depending on the elasticity of demand differences.”).

⁴³⁴ McFadden Report, at ¶ 133 (“These economic principles can be applied to all iOS device consumers who spent money on the App Store during the Class Period, i.e., the Consumer Class and *all app developers who are subject to the App Store commission.*”) (emphasis added). Professor McFadden defines the Consumer Class as “all persons in the United States who purchased one or more iOS applications or application licenses from Apple, or who paid Apple for one or more in-app purchases (defined below), including, but not limited to, any subscription purchase, for use on an iOS device at any time since July 10, 2008[.]”. See McFadden Report, at ¶ 8.

⁴³⁵ Economides Report, at ¶ 7 (“The class in the present action is defined as ‘All U.S. developers of any Apple iOS application or in-app product (including subscriptions) sold for a non-zero price via Apple’s iOS App Store at any time on or after June 4, 2015.’”).

⁴³⁶ Economides Deposition, at 73:20-74:23 (“Q. Are you aware that Professor McFadden has the opinion that Apple is a retailer of apps, as an economic matter? [...] If you must have read it, do you agree with it or disagree with it? [...] THE DEPONENT [...] Traditionally, a retailer is somebody who gets a product, puts it on his shelf, and then resells it. That’s what traditionally retailing means. Now, Apple doesn’t seem to be doing that, you know. [...] So that’s why I think the discussion on retailing and so on is a bit off the subject.”).

⁴³⁷ Elhauge Deposition, at 125:25-126:6 (“Q. Is your iOS app distribution market definition a cluster market? A. No. Q. Isn’t it true that your relevant market groups together different types of nonsubstitute app transactions? A. No.”).

submarkets—for example, a distinct game submarket—could exist, and that he had defined a market with different products grouped together.⁴³⁸

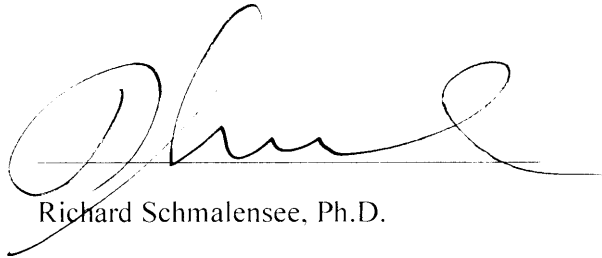
E. Due to the Fatal Flaws Described Above, Plaintiffs’ Experts’ Analyses Cannot Reliably Estimate the Change in Total Output or Harm to Individual Class Members

229. Plaintiffs’ experts’ analyses are unable to account for the complexities of the two-sided platform setting and posit an implausible but-for world. Their models cannot be fixed to account for more likely but-for world scenarios and therefore cannot demonstrate that all class members were harmed nor can they measure harm across individual class members.

⁴³⁸ McFadden Deposition, at 69:9-15 (“[I]f for other economic purposes you want to define the market narrowly to limit it to close substitutes, then -- then sub- -- submarkets may -- may be important for that purpose. So it may be that -- that game -- game markets are a -- a distinct market for some purposes.”) and 55:9-56:2 (“Q. Do you, in this case, define a market that encompasses different products grouped together? A. I would -- I would say, yes, I do. And as -- as is -- as is standard, that is to say, when one -- when one talks about defining a market where products are -- are differentiated in any way, the -- the critical question is where -- where -- where does the differentiation matter enough so that they’re not easy substitutes, so they’re really distinct markets [...] And that -- that’s a -- that’s an empirical practical distinction. Of course, it -- it matters in cases like this.”).

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on August 10, 2021.

A handwritten signature in black ink, appearing to read 'Schmalensee', is written over a horizontal line. The signature is fluid and cursive, with a large initial 'S' and a trailing flourish.

Richard Schmalensee, Ph.D.

Exhibit 1: Overview of Digital Distribution Platforms

Platform	Operating System/Device^[1]	Year Introduced	Year Discontinued	Nominal Commission Rate^[2]
Consoles				
Xbox Live Marketplace ^[3]	Xbox	2005		30%
PlayStation Store	PlayStation	2006		30%
Nintendo Wii Shop Channel	Nintendo (Wii)	2006	2019	30%
Nintendo eShop	Nintendo	2011		30%
Mobile				
Handango InHand ^[4]	Android, BlackBerry OS, Palm, Symbian, Windows Mobile, Java	1999	2017 or earlier	30-40%
GetJar	Android, Java, Symbian, Blackberry, Windows Mobile, Linux	2005		0%
Apple App Store	iOS	2008		30%
Google Play ^[5]	Android	2008		30%
BlackBerry World	Blackberry 10/OS	2009		30%
Ovi Store ^[6]	Symbian (Nokia)	2009	2015	30-40%
HP App Catalog	Linux/webOS	2009	2015	30%
Galaxy Store ^[7]	Android, Tizen, Windows Mobile, Bada	2009		30%
Windows Phone Marketplace ^[8]	Windows Phone	2010		30%
Aptoide	Android	2010		25%
Opera Mobile Store	Android, Java, BlackBerry OS, iOS, Symbian, Windows Phone	2011		30-50%
Amazon Appstore	Android, Blackberry 10	2011		30%
LG SmartWorld ^[9]	Android	2011		30%
Huawei AppGallery ^[10]	Android	2011		20-50%
OpenStore for Ubuntu Touch	Unix/Open-Source	2013 or earlier		N/A
PureOS Software Center	Linux/Open-Source	2017 or earlier		N/A
PC				
Battle.net (Blizzard)	Windows, Mac, Android, iOS	1996		N/A*
RealArcade ^[11]	Windows, Mac	2001		“Not free”
Metaboli/Gamesplanet ^[12]	Windows, Mac, Linux	2001		“Small Portion”
Big Fish Games	Windows, Mac	2002		N/A
Steam	Windows, Mac, Linux, Steam, SteamVR-compatible	2003		20-30%
Game Jolt	Windows, Mac, Linux	2003		0-10%
iPlay ^[13]	Windows	2003		N/A
Direct2Drive	Windows	2004		N/A
Windows Marketplace ^[14]	Windows	2004		12-30%
GamersGate	Windows, Mac, Linux	2006		30%
Kongregate	Web-based	2007		30%
GameStop PC Downloads ^[15]	Windows	2008	2014	N/A
GOG.com	Windows, Mac, Linux	2008		30-40%
Ubuntu Software Center	Ubuntu	2009		N/A
Green Man Gaming	Windows, Mac, Xbox, PlayStation, Oculus, VIVE, Windows MR	2010		30%
Beamdog	Windows, Mac, Linux	2010		N/A*
Desura	Windows, Mac, Linux	2010	2016	30%
Humble Bundle ^[16]	Windows, Mac, Linux, Nintendo, Android, Oculus, VIVE, Windows MR	2010		25%
DotEmu	Windows	2010	2017	N/A
Mac App Store	Mac	2011		30%
Playism	Windows, Mac, Linux, Xbox, Playstation, Nintendo	2011		N/A
Origin	Windows, Mac	2011		30%*
Ubisoft Connect ^[17]	Windows, Xbox, PlayStation, Nintendo, Oculus, VIVE	2012		30%*
itch.io	Windows, Mac, Linux, Android	2013		Developers choose; 10% default
Snap Store	Ubuntu/Linux	2014		N/A
Bethesda.net	Windows	2016		N/A*
Kartridge	Windows, Mac	2018		0-30%; Tiered
Epic Games Store	Windows, Mac	2018		12%
Virtual Reality^[18]				
Oculus (Facebook) ^[19]	Oculus	2016		30%
VIVEPORT (HTC)	VIVE, Oculus, Valve Index, Windows Mixed Reality	2016		30%

Exhibit 1: Overview of Digital Distribution Platforms

Notes:

- [1] Some of the listed operating systems may no longer be supported.
- [2] * Denotes that only self-published games are distributed.
- [3] Xbox Live Marketplace was rebranded as Xbox Store in 2013 and merged with Microsoft Store in 2017.
- [4] Handango InHand, the on-device app store, launched in 2003. Handango was acquired by PocketGear in 2010, and PocketGear rebranded as Appia in 2011.
- [5] Google Play was formerly known as Android Market.
- [6] Nokia Content Discoverer, later renamed Nokia Download!, launched in 2006. In 2009 it was replaced by Ovi Store, which later became Nokia Store and was replaced by Opera Mobile in 2015.
- [7] Galaxy Store was formerly known as Samsung Apps and Galaxy Apps.
- [8] Windows Phone Marketplace was rebranded as Windows Phone Store in August 2012 and merged with Windows Store, now known as Microsoft Store, in 2015.
- [9] LG SmartWorld’s paid app store launched in July 2011 in the UK and October 2011 in the US.
- [10] Huawei AppGallery launched in 2011 in China and in 2018 worldwide.
- [11] RealNetworks, owner of RealArcade, bought GameHouse in 2004. RealArcade.com redirects to GameHouse.com.
- [12] Metaboli launched in France in 2001 and announced its acquisition of GameTap, a US-based distribution platform that launched in 2005, in 2008.
- [13] iPlay was formerly known as Oberon.
- [14] Windows Marketplace was replaced with Windows Store in 2012 and rebranded as Microsoft Store in 2017.
- [15] GameStop PC Downloads was formerly known as Impulse. PC games are still available for download through GameStop.com as of January 2021.
- [16] The Humble Store, which allowed for purchase of individual games, launched in 2013.
- [17] Ubisoft Connect was formerly known as Uplay.
- [18] PlayStation VR, Windows Mixed Reality, and Valve Index games are sold on PlayStation Store, Microsoft Store, and Steam, respectively.
- [19] Oculus Store also sold games for Samsung Gear VR, which was discontinued in September 2020.
- [20] I have not fully documented the details of how each of these platforms structures its commissions or how commissions may have changed over time; additionally, I have not fully documented fees which may vary based on product characteristics, e.g., digital goods and physical goods may be treated differently on some platforms but not others.
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Exhibit 2: Overview of Competitive Alternatives for Named Plaintiff Cameron’s Lil’ Baby Names App

iOS Application Name ^[1]	Source ^[2]
Cost: Free	
Babies Name	https://apps.apple.com/us/app/babies-name/id1434911336
Baby Affinity	https://apps.apple.com/us/app/baby-affinity/id1547913226
Baby Boy & Girl Names Meaning	https://apps.apple.com/us/app/baby-boy-girl-names-meaning/id1488731209
Baby Boy Names LITE	https://apps.apple.com/us/app/baby-boy-names-lite/id337407164
Baby Girl Name Assistant	https://apps.apple.com/us/app/baby-girl-name-assistant/id514528612
Baby Girl Names LITE	https://apps.apple.com/us/app/baby-girl-names-lite/id337407498
Baby Name Game	https://apps.apple.com/us/app/baby-name-game/id828219354
Baby name generator free	https://apps.apple.com/us/app/baby-name-generator-free/id1000393051
Baby Name Genie	https://apps.apple.com/us/app/baby-name-genie/id1481955492
Baby Name Helper - FREE	https://apps.apple.com/us/app/baby-name-helper-free/id1000336810
Baby Name Inspiration	https://apps.apple.com/uy/app/baby-name-inspiration/id1142790317
Baby Name Randomizer - Boys	https://apps.apple.com/us/app/baby-name-randomizer-boys/id1384158544
Baby Name Randomizer - Girls	https://apps.apple.com/us/app/baby-name-randomizer-girls/id1383846234
Baby Name Together	https://apps.apple.com/us/app/baby-name-together/id918073224
Baby Namer -Perfect Baby Names	https://apps.apple.com/us/app/baby-namer-perfect-baby-names/id1217496956
Baby Names	https://apps.apple.com/us/app/baby-names/id412443566
Baby Names - Bnames	https://apps.apple.com/uy/app/baby-names-bnames/id1246974447
Baby Names - Popular names for boys & girls	https://apps.apple.com/ae/app/baby-names-popular-names-for-boys-girls/id1071746119
Baby Names (•••)	https://apps.apple.com/us/app/baby-names/id473526598
Baby Names (Pro)	https://apps.apple.com/gb/app/baby-names-pro/id1565660752
Baby Names ++	https://apps.apple.com/bs/app/baby-names/id852333382
Baby names all over the world	https://apps.apple.com/us/app/baby-names-all-over-the-world/id1439733961
Baby Names Assistant	https://apps.apple.com/kz/app/baby-names-assistant/id1202273306
Baby Names A-Z Pregnancy App	https://apps.apple.com/us/app/baby-names-a-z-pregnancy-app/id1518550358
Baby Names by BabyCenter	https://apps.apple.com/us/app/baby-names-by-babycenter/id1336227072
Baby Names by Nametrix	https://apps.apple.com/us/app/baby-names-by-nametrix/id884932597
Baby Names Collection	https://apps.apple.com/ca/app/baby-names-collection/id1031196049
Baby Names for boy and girl	https://apps.apple.com/us/app/baby-names-for-boy-and-girl/id1439295244
Baby Names for boys and girls	https://apps.apple.com/us/app/baby-names-for-boys-and-girls/id1130761039
Baby Names Generator	https://apps.apple.com/us/app/baby-names-generator/id1335316378
BABY NAMES GENERATOR	https://apps.apple.com/us/app/baby-names-generator/id920461047
Baby Names Generator for Boys Girls and Twins, 2014 Top Popular Boy Girl Total Name List	https://apps.apple.com/us/app/baby-names-generator-for-boys-girls-twins-2014-top/id743858886
Baby Names Generator Pro+	https://apps.apple.com/us/app/baby-names-generator-prop/id568870675
Baby Names LITE	https://apps.apple.com/us/app/baby-names-lite/id337403469
Baby Names Mania	https://apps.apple.com/us/app/baby-names-mania/id594784300
Baby Name Matcher	https://apps.apple.com/us/app/baby-name-matcher/id1296585395
Baby Names Pedia	https://apps.apple.com/ph/app/baby-names-pedia/id1473769480
Baby Names Swipe	https://apps.apple.com/in/app/baby-names-swipe/id153377652
Baby names US - Most Popular Names	https://apps.apple.com/us/app/baby-names-us-most-popular-names/id1001043900
Baby Names With Meanings	https://apps.apple.com/no/app/baby-names-with-meanings/id1558340588
Baby Names Worldwide Free	https://apps.apple.com/us/app/baby-names-worldwide-free/id432793582
Baby Names!!!	https://apps.apple.com/us/app/baby-names/id1305854768
Baby Names: Meaning & Origin	https://apps.apple.com/us/app/baby-names-meaning-origin/id1156915968
Baby Names-Boy and Girl	https://apps.apple.com/us/app/baby-names-boy-and-girl/id1260214494
Baby Names™	https://apps.apple.com/us/app/baby-names/id353938652
BabyName - find it together	https://apps.apple.com/us/app/babyname-find-it-together/id950562312
BabyNames - Name Meaning	https://apps.apple.com/us/app/babynames-name-meaning/id1552472655
Baby-Names Pro	https://apps.apple.com/us/app/baby-names-pro/id436678431
Beautiful Baby Names	https://apps.apple.com/us/app/beautiful-baby-names/id982331589
Bubtag	https://apps.apple.com/us/app/bubtag/id1229009366
Bump Names	https://apps.apple.com/us/app/bump-names/id967748034
CharliesNames	https://apps.apple.com/us/app/charliesnames/id990425943
Christian Baby Names : Meaning	https://apps.apple.com/us/app/christian-baby-names-meaning/id1367640558
Easy Baby Names+	https://apps.apple.com/us/app/easy-baby-names/id565095516
First Step : Baby names & Care	https://apps.apple.com/us/app/first-step-baby-names-care/id1516060554
FirstCry Baby Names Finder	https://apps.apple.com/us/app/firstcry-baby-names-finder/id1543746945
Future Baby Names Generator	https://apps.apple.com/ao/app/future-baby-names-generator/id1454068334
Generate Baby Name	https://apps.apple.com/mn/app/generate-baby-name/id1481925581
Kids Name For all Religion	https://apps.apple.com/in/app/kids-name-for-all-religion/id1251538318
Kinder - Find Baby Names	https://apps.apple.com/na/app/kinder-find-baby-names/id1068421785
Name for baby - Child’s Name	https://apps.apple.com/us/app/name-for-baby-childs-name/id1189761833
Name My Kid	https://apps.apple.com/us/app/name-my-kid/id1315240913
Namesly	https://apps.apple.com/iq/app/namesly/id1416856961
Original Names for your Baby	https://apps.apple.com/us/app/original-names-for-your-baby/id1520393735
Perfect Baby Name Finder	https://apps.apple.com/us/app/perfect-baby-name-finder/id1173078536

Exhibit 2: Overview of Competitive Alternatives for Named Plaintiff Cameron’s Lil’ Baby Names App

iOS Application Name ^[1]	Source ^[2]
Cost: Free	
Pip : The Baby Name App	https://apps.apple.com/us/app/pip-the-baby-name-app/id1195423710
Popular Baby Names Meaning	https://apps.apple.com/us/app/popular-baby-names-meaning/id1253756167
RandomName - Random Names	https://apps.apple.com/us/app/randomname-random-names/id981346985
Top Baby Names Boys & Girls with Meanings	https://apps.apple.com/us/app/top-baby-names-boys-girls-with-meanings/id1141571031
Unique Baby Names	https://apps.apple.com/us/app/unique-baby-names/id1358998689
Cost: \$0.99	
Baby Names - English	https://apps.apple.com/us/app/baby-names-english/id369308877
Baby Names - Irish	https://apps.apple.com/us/app/baby-names-irish/id383028046
Baby Names Dictionary	https://apps.apple.com/us/app/baby-names-dictionary/id1224895619
BabyName(s)	https://apps.apple.com/us/app/babynames/id595247358
Beautiful Baby Names PRO	https://apps.apple.com/us/app/beautiful-baby-names-pro/id982330732
English Baby Names	https://apps.apple.com/us/app/english-baby-names/id1406764252
Namy - baby names	https://apps.apple.com/us/app/namy-baby-names/id1452825220
Cost: \$1.99	
Baby Name Assistant	https://apps.apple.com/us/app/id512907430
Baby Name Custom Maker	https://apps.apple.com/us/app/baby-name-custom-maker/id1546064891?platform=iphone
Baby Name Generator	https://apps.apple.com/us/app/baby-name-generator/id354931789
Baby Names by Nametrix Premium	https://apps.apple.com/us/app/baby-names-by-nametrix-premium/id583827076
Baby Names Helper & Collection	https://apps.apple.com/us/app/baby-names-helper-collection/id522001042
Baby Names Worldwide HD	https://apps.apple.com/us/app/baby-names-worldwide-hd/id434459337
Boys and Girls Baby Names	https://apps.apple.com/us/app/boys-and-girls-baby-names/id417263302
Cost: \$2.99	
60,000 Baby Names Pro	https://apps.apple.com/us/app/60-000-baby-names-pro/id597171420
Baby Name Together PRO	https://apps.apple.com/us/app/baby-name-together-pro/id918105155
Lil’ BabyNames ^[3]	https://apps.apple.com/us/app/lil-babynames/id1015004770
Cost: \$3.00+	
Nefna \$10.99 ^[4]	https://apps.apple.com/us/app/nefna/id648680743
Website^[5]	
215 Unique Baby Girl Names for One-of-a-Kind Baby Girls	https://www.fatherly.com/love-money/101-unique-baby-girl-names/
350+ Most Popular Baby Names 2021	https://parade.com/969021/marlyniles/popular-baby-names/
Baby names Most Popular Baby Names Bounty	https://www.bounty.com/pregnancy-and-birth/baby-names/baby-name-search
Baby Names Finder BabyCenter	https://www.babycenter.com/baby-names
Baby Names: Inspiration, Ideas, and Lists Pampers	https://www.pampers.com/en-us/pregnancy/baby-names
Baby Names and Meanings at BabyNames.com	https://babynames.com/
Discover Baby Names for Boys & Girls The Bump	https://www.thebump.com/baby-names
Baby Names Nameberry	https://nameberry.com/
Popular Baby Names	https://www.ssa.gov/oact/babynames/
Unique, Cute & Popular Baby Names for Boys & Girls	https://www.whattoexpect.com/baby-names/
Book^[6]	
100,000+ Baby Names	https://www.barnesandnoble.com/w/100000-baby-names-bruce-lansky/1122403152
Best Baby Names 2021	https://www.amazon.com/Best-Baby-Names-2021/dp/1785043226
Beyond Ava & Aiden: The Enlightened Guide to Naming your Baby	https://www.amazon.com/Beyond-Ava-Aiden-Enlightened-Naming/dp/0312539150
The Baby Name Wizard	https://www.amazon.com/Baby-Name-Wizard-Revised-3rd/dp/0770436471
The Best Baby Names for Girls	https://www.amazon.com/Best-Baby-Names-Girls-Ultimate/dp/1492697311
The Big Book of 60,000 Baby Names	https://www.amazon.com/Big-Book-000-Baby-Names/dp/1402209509
The Complete Book of Baby Names	https://www.amazon.com/Complete-Book-Baby-Names-Idea-Generating/dp/1402224559
The Name Book	https://www.amazon.com/Name-Book-Meanings-Spiritual-Significance/dp/0764205668
The Penguin Book of Baby Names	https://www.amazon.com/Penguin-Book-Baby-Names/dp/0141040858
The Very Best Baby Name Book in the Whole Wide World	https://www.amazon.com/Very-Best-Baby-Whole-World/dp/0671561138

Notes:

[1] The iOS applications above were found by searching for “Baby Names” on the iOS App Store.

[2] All sources accessed on 8/3/2021.

[3] Named Plaintiff Donald Cameron is the developer of Lil’ BabyNames. See Plaintiffs’ Consolidated Class Action Complaint for Violations of the Sherman Act and California Unfair Competition Law, Cameron et al. v. Apple Inc., No. 4:19-cv-03074-YGR, September 30, 2021, at ¶13.

[4] Dozens of additional distant substitutes exist and were not included in this list. Nefna, an Icelandic baby naming app, is an example of a distant substitute that has been provided in this list.

[5] The 10 websites above were found by searching “Baby Names” on Google. Many other baby naming websites exist in addition to those above.

[6] The 10 books above were found by searching “Baby Names book” on Google. The above books range from a minimum price of \$8.99 to a maximum price of \$19.99. There are many additional baby naming books which were not included above.

Exhibit 3: Overview of Competitive Alternatives for Named Plaintiff Pure Sweat Basketball Inc.’s Pure Sweat Basketball Workout App

iOS Application Name ^[1]	Source ^[2]
Cost: Free	
1x1 Basketball Training - Video Guide	https://apps.apple.com/us/app/1x1-basketball-training-video-guide/id981617290
Academy by In The Lab	https://apps.apple.com/us/app/academy-by-in-the-lab/id1508624570
All-Around	https://apps.apple.com/us/app/all-around/id1218143119
Anywhere Basketball	https://apps.apple.com/tn/app/anywhere-basketball/id1528767277
Basketball Advanced Training	https://apps.apple.com/us/app/basketball-advanced-training/id1058745063
Basketball Big Man Training	https://apps.apple.com/us/app/basketball-big-man-training/id997734543
Basketball Blueprint	https://apps.apple.com/us/app/basketball-blueprint/id936234445
Basketball Dribbling	https://apps.apple.com/us/app/basketball-dribbling/id979520674
Basketball Drill Down	https://apps.apple.com/us/app/basketball-drill-down/id1240369136
Basketball Finishing	https://apps.apple.com/us/app/basketball-finishing/id1000562567
Basketball Guard Skills	https://apps.apple.com/us/app/basketball-guard-skills/id966192814
Basketball HQ	https://apps.apple.com/us/app/basketball-hq/id1219627050
Basketball Moves	https://apps.apple.com/us/app/basketball-moves/id988316202
Basketball Practice Planner	https://apps.apple.com/us/app/basketball-practice-planner/id985491490
Basketball Shooting	https://apps.apple.com/us/app/basketball-shooting/id988318832
Basketball Skills Training	https://apps.apple.com/us/app/basketball-skills-training/id1441025834
Basketball Strength Training	https://apps.apple.com/us/app/basketball-strength-training/id1010589988
Basketball Training	https://apps.apple.com/us/app/basketball-training/id738165126
Beats Basketball	https://apps.apple.com/my/app/beats-basketball/id1313091892
Blueprint Athletes Basketball	https://apps.apple.com/us/app/blueprint-athletes-basketball/id1352866958
Breakthrough Basketball	https://apps.apple.com/us/app/breakthrough-basketball/id1493184798
ChrisJohnsonHoops	https://apps.apple.com/us/app/chrisjohnsonhoops/id1464251158
COURTSMITH	https://apps.apple.com/us/app/courtsmith/id1508358463
CPE Basketball	https://apps.apple.com/gb/app/cpe-basketball/id1462377503
CT15 - Difference-Maker Workouts by MOTI™	https://apps.apple.com/us/app/ct15-difference-maker-workouts-by-moti/id979875342
Dr. Dish All-Star and Pro	https://apps.apple.com/us/app/dr-dish-all-star-and-pro/id1017780182
Dr. Dish Player	https://apps.apple.com/us/app/dr-dish-player/id1483790879
Dribble Stick Training	https://apps.apple.com/us/app/dribble-stick-training/id1357127898
DribbleUp Basketball	https://apps.apple.com/us/app/dribbleup-basketball/id1455744414
eCoachBasketball	https://apps.apple.com/us/app/ecoachbasketball/id1275940062
Elete: Dribbling Training	https://apps.apple.com/us/app/elete-dribbling-training/id1454189239
Finishing	https://apps.apple.com/us/app/finishing/id1515160431
GetUp Jump Higher	https://apps.apple.com/bj/app/getup-jump-higher/id895973682
HandleLife Training	https://apps.apple.com/us/app/handlelife-training/id1456688635
Homecourt: Basketball Training	https://apps.apple.com/us/app/homecourt-basketball-training/id1258520424
HoopLife	https://apps.apple.com/us/app/hooplife/id1442953602
Hoops and Christ	https://apps.apple.com/us/app/hoops-and-christ/id1449186230
Hoops: AI Basketball Training	https://apps.apple.com/us/app/hoops-ai-basketball-training/id1563442235
Hustle at Home Sports Training	https://apps.apple.com/us/app/hustle-at-home-sports-training/id998800047
I'm Possible Cloud	https://apps.apple.com/id/app/im-possible-cloud/id1563653952
Jump higher - Learn to Dunk	https://apps.apple.com/us/app/jump-higher-learn-to-dunk/id739500884
KaiBall Athletics	https://apps.apple.com/us/app/kaiball-athletics/id1564354996
KP Training	https://apps.apple.com/bb/app/kp-training/id1512501743
MaxOne	https://apps.apple.com/us/app/maxone/id1274244831
One Court Basketball	https://apps.apple.com/us/app/one-court-basketball/id1537256608
OtterBasketball Training	https://apps.apple.com/cz/app/otterbasketball-training/id1538536205
Paul Easton Basketball	https://apps.apple.com/us/app/paul-easton-basketball/id1572211821
PGC Phoenix	https://apps.apple.com/us/app/pgc-phoenix/id1462181501
PSB+ Basketball Training	https://apps.apple.com/us/app/psb-basketball-training/id1519019870
Pure Sweat Basketball Workouts ^[3]	https://apps.apple.com/us/app/pure-sweat-basketball-workouts/id891692081
Shooting Checklist	https://apps.apple.com/us/app/shooting-checklist/id1497276516
Smart Basketball Training	https://apps.apple.com/us/app/smart-basketball-training/id1001307051
Stages Basketball	https://apps.apple.com/us/app/stages-basketball/id1516834243
SuperHandles	https://apps.apple.com/us/app/superhandles/id1223499368
Swish Hoop Player: Basketball	https://apps.apple.com/us/app/swish-hoop-player-basketball/id1332794224
Tally Hoops - Basketball Stats	https://apps.apple.com/us/app/tally-hoops-basketball-stats/id1394372644
Train Anywhere Anytime Program	https://apps.apple.com/tn/app/train-anywhere-anytime-program/id1555142361
Veolve - Sports Training	https://apps.apple.com/us/app/veolve/id1457099727

Exhibit 3: Overview of Competitive Alternatives for Named Plaintiff Pure Sweat Basketball Inc.’s Pure Sweat Basketball Workout App

iOS Application Name ^[1]	Source ^[2]
Cost: \$0.99	
Basketball Training - How to Take Your Game To a Higher Level	https://apps.apple.com/us/app/basketball-training-how-to-take-your-game-to-a-higher-level/id979188444
Cost: \$2.99	
HORNS Offense: Powerful Scoring Plays Using The A-Set - With Coach Lason Perkins - Full Court Basketball Training Instruction	https://apps.apple.com/us/app/horns-offense-powerful-scoring-plays-using-set-coach/id728214913
Cost: \$3.00+	
InfiniteHoops Practice \$4.99	https://apps.apple.com/us/app/infinitehoops-practice/id763306606
Cost: \$9.99/month subscription	
94FEETOFGAME Basketball Drills	https://apps.apple.com/us/app/94feetofgame-basketball-drills/id1475428449
Website^[4]	
12 Basketball Workout Plans for at Home and Gym	https://www.breakthroughbasketball.com/training/workouts.html
A Basketball Training Guide for the Complete Athlete Vertimax	https://www.vertimax.com/blog/a-basketball-training-guide-for-the-complete-athlete
Basketball Training Program Elite Basketball	https://elitebasketballsecrets.wordpress.com/basketball-training-program/
Coach Brock Bourgase Basketball Coaching and Training	https://bourgase.com/
Free Basketball Training & Workouts	http://www.trainforhoops.com/
Free Basketball Training & Workouts	https://www.yourhousefitness.com/blog/the-ultimate-basketball-training-program
IMPACT Basketball- Online Training for Coaches, Players, & Parents	https://impactbball.com/online-basketball-player-development-video-training/
Team Curry UAA & GUAA Pro Skills Basketball	https://proskillsbasketball.com/online-basketball-training/
The 12-Month Basketball Training Program Sports Fitness Advisor	https://www.sport-fitness-advisor.com/basketball-training-program.html
USA Basketball - The Definitive 6-Week Guard Workout	https://www.usab.com/youth/news/2012/06/the-definitive-6-week-guard-workout.aspx
YouTube Channel^[5]	
By Any Means Basketball	https://www.YouTube.com/channel/UC6K_cvzQldsdHUVnX9ug
DeepGame	https://www.YouTube.com/channel/UC_sCpt3hgixbhBjlk3WkbbA
EliteAthletesBE	https://www.YouTube.com/user/EliteAthletesBE
Grit to Great Basketball	https://www.YouTube.com/channel/UCMLi6XYNb5NIGcn15PoEdIA
I’m Possible Training	https://www.YouTube.com/user/ImPossibleTraining
Phil Handy	https://www.YouTube.com/channel/UC4UEDK2mADDF550xXq01YpA
PJFPerformance	https://www.YouTube.com/user/PJFPerformance
SmartBasketballTraining	https://www.YouTube.com/channel/UCb7Olfa1YMyV3jdRGk1INg
TAPETrainingSystems	https://www.YouTube.com/user/TAPETrainingSystems
Tyler Relph’s Hoop Dynamic	https://www.YouTube.com/user/TylerRelph

Notes:

[1] The iOS applications above were found by searching for “Basketball Training” on the iOS App Store.

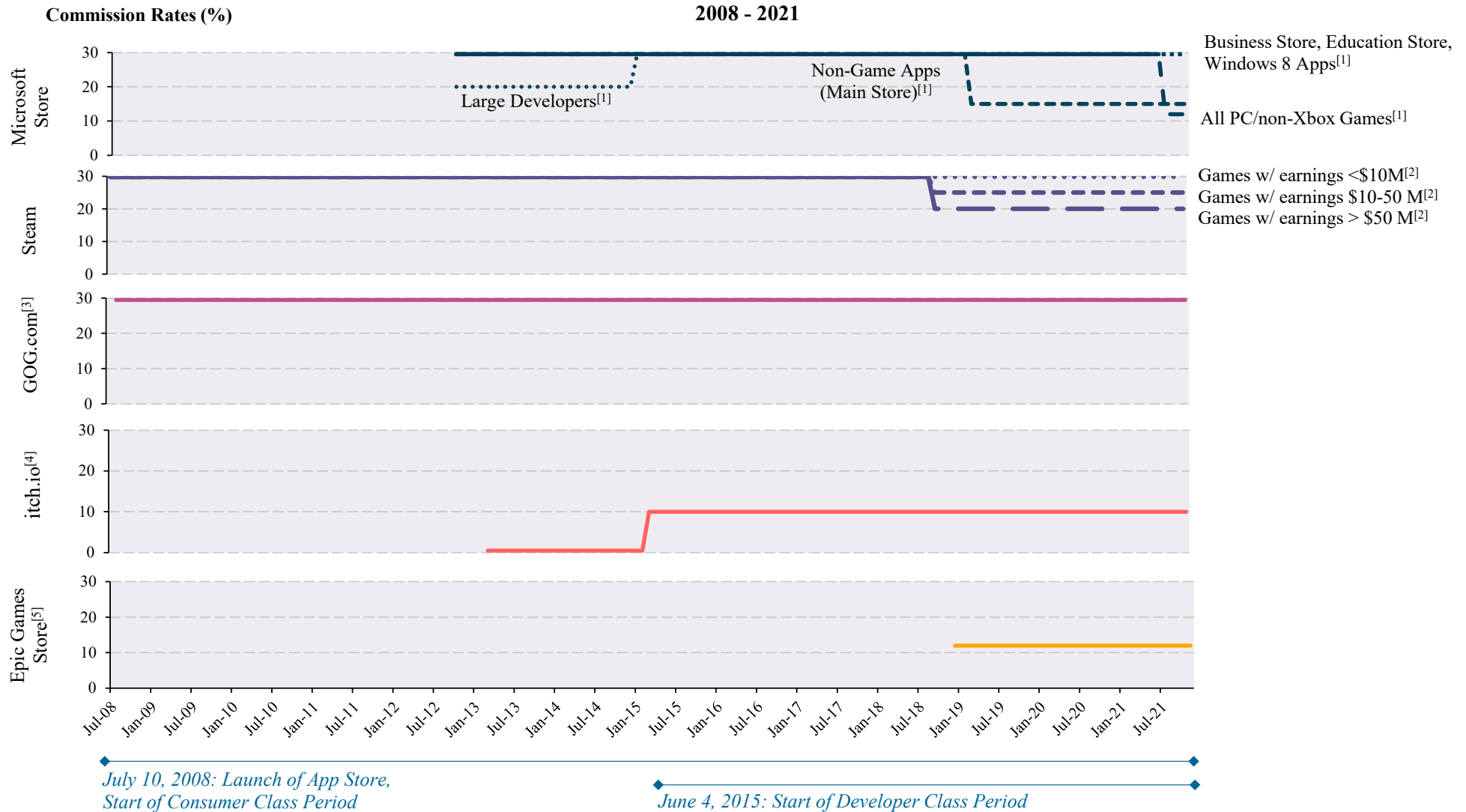
[2] All sources were accessed on 8/3/2021 and 8/4/2021.

[3] Named Plaintiff Pure Sweat Basketball, Inc. is the corporation that developed the Pure Sweat Basketball Workout App. *See* Plaintiffs’ Consolidated Class Action Complaint for Violations of the Sherman Act and California Unfair Competition Law, Cameron et al. v. Apple Inc., No. 4:19-cv-03074-YGR, September 30, 2021, at ¶18.

[4] The 10 websites above were found by searching “Basketball Training Program” on Google. Many other basketball training websites exist in addition to the above list.

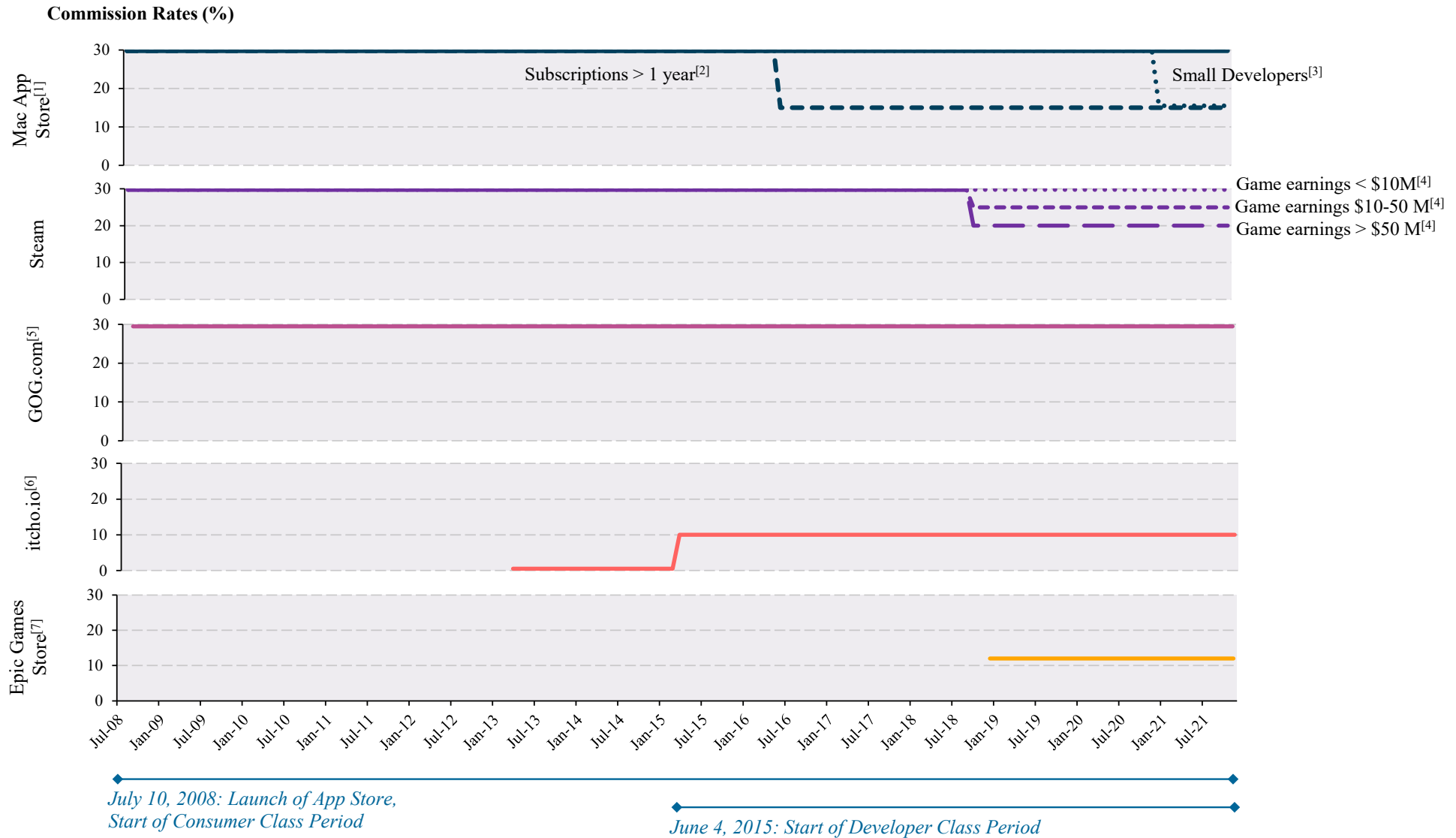
[5] The 10 YouTube channels above were found by searching “Basketball Training Program” on YouTube and filtering to channels with more than 10k subscribers. There were many other basketball training YouTube channels in addition to the above list.

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Exhibit 4.A: Actual World Headline Commission Rates - Windows**Notes:**

- [1] Windows Store launched in October 2012 and was rebranded as Microsoft Store in 2017. In the same year, Xbox Store merged with Microsoft Store. Prior to January 1, 2015, Microsoft charged developers earning more than \$25,000 a 20% commission rate. Beginning in 2015, all developers were charged a 30% commission rate. Beginning in March 2019, non-game app purchases were charged a 15% commission rate. Beginning in August 2021, Microsoft announced PC/non-Xbox game apps will be charged a 12% commission. From March 2019 to January 2020, Microsoft Store charged a 5% commission on non-game apps if consumers used a direct URL to access the app's page instead of finding the site through Microsoft Store's search functionality. Effective July 28, 2021, developers of non-game apps now have the option to use their own billing system or a third party commerce platform on their apps, allowing the developer to keep 100% of app revenue.
- [2] On October 1, 2018, Steam enacted a tiered commission system where game earnings below \$10 million are charged a 30% commission, game earnings between \$10 and \$50 million are charged a 25% commission, and game earnings over \$50 million are charged a 20% commission.
- [3] One third-party source from 2017 states that the commission charged by GOG.com was 40% if the developer opted for an advance on their royalties.
- [4] As of March 23rd, the default commission rate is 10%, however this is optional. The developer can choose any commission rate between 0-100%.
- [5] In December 2019, Epic announced that developers could use alternative, third-party payment services for in-app purchases. Developer can keep 100% of the revenue generated through an alternative payment service.

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Exhibit 4.B: Actual World Headline Commission Rates - macOS**2008 - 2021****Notes:**

[1] Commission rates defined within the Apple Developer Program License Agreement and displayed within this chart apply uniformly across iOS and macOS applications.

[2] The decreased commission applies to subscriptions after the first twelve months.

[3] Apple App Store defines small developers as those with earnings below \$1 million in a calendar year.

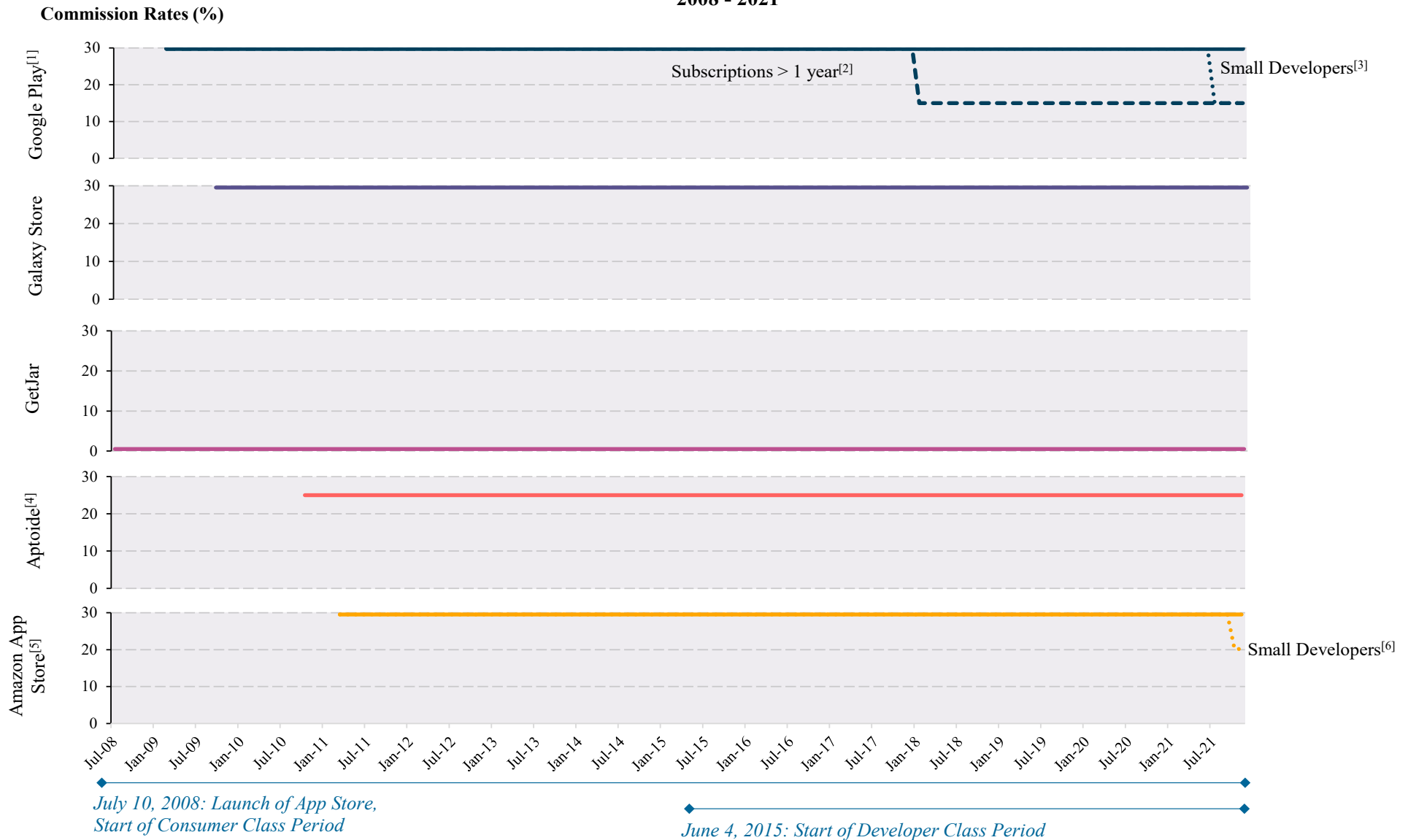
[4] On October 1, 2018, Steam enacted a tiered commission system where game earnings below \$10 million are charged a 30% commission, game earnings between \$10 and \$50 million are charged a 25% commission, and game earnings over \$50 million are charged a 20% commission.

[5] One third-party source from 2017 states that the commission charged by GOG.com was 40% if the developer opted for an advance on their royalties.

[6] As of March 23rd, the default commission rate is 10%, however this is optional. The developer can choose any commission rate between 0-100%.

[7] In December 2019, Epic announced that developers could use alternative, third-party payment services for in-app purchases. Developer can keep 100% of the revenue generated through an alternative payment services.

Exhibit 4.C: Actual World Headline Commission Rates - Android
2008 - 2021

**Notes:**

[1] Google Play Store launched in October 2008 but did not have paid downloads until February 2009.

[2] The decreased commission applies to subscriptions after the first twelve months.

[3] As of July 1, 2021, Google Play charges a 15% commission for the first \$1 million of earnings and a 30% commission for all earnings in excess of \$1 million.

[4] Developers using Aptoide keep 75% of earnings. Aptoide then splits the remaining 25% with partners of the company, giving the partners 15% of total developer earnings and keeping 10%.

[5] Amazon charges a 20% commission for video streaming subscriptions.

[6] Amazon App Store defines small developers as those with earnings below \$1 million in a calendar year.

Exhibit 4: Sources

Amazon App Store

- [1] Cowley, Stacy, “Amazon prepares to launch Android Appstore,” *CNN*, January 5, 2011, available at https://money.cnn.com/2011/01/05/technology/amazon_appstore/index.htm.
- [2] “Amazon Launches its Own Android App Store,” *Wired*, March 22, 2011, available at <https://www.wired.com/2011/03/amazon-android-app-store-2/>.
- [3] “Coming Soon: Amazon Appstore Small Business Accelerator Program,” *Amazon*, June 15, 2021, available at <https://developer.amazon.com/blogs/appstore/post/93e89be7-1611-4764-8f97-f4eef0a7c0e0/coming-soon-amazon-appstore-small-business-accelerator-program>.
- [4] “Amazon pulls an Apple by reducing its app store cut for some smaller developers,” *The Verge*, June 16, 2021, available at <https://www.theverge.com/2021/6/16/22537726/amazon-app-store-cut-revenue-1-million-80-20-10>.
- [5] “Amazon Developer Services Agreement,” *Amazon*, June 9, 2021, available at <https://developer.amazon.com/support/legal/da>.

Aptiode

- [1] “About Us,” *Aptiode*, available at <https://en.aptiode.com/company/about-us>, accessed on August 8, 2021.
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Epic Games Store

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Exhibit 5.A: Pricing Strategies of Two-Sided Platforms OS Developer Benchmarks

Policy Consideration	Apple’s Pricing Strategies			Potential OS Developer Benchmarks’ Pricing Strategies					
	Actual World	Plaintiffs’ But-For World	Likely But-For World	Google Play	Microsoft Store (Windows PC)	Mac App Store	Microsoft Store (Xbox)	PlayStation	BlackBerry ^[1]
Access to IP and Distribution on Store									
Fee to Access Developer Environment^[A] (e.g., Xcode)	Free ^[1]	No Change	?	Free ^[1]	Free ^[1]	Free ^[1]	Free ^[1]	Undisclosed ^[1]	Free ^[2]
Fee to Distribute on Store (e.g., Developer Program Fee)	\$99 / Year (Individual) \$299 / Year (Enterprise) ^[2]	No Change	?	\$25 ^[2]	\$19 (Individual) \$99 (Company) ^[2]	\$99 / Year (Individual) \$299 / Year (Enterprise) ^[2]	\$19 (Individual) \$99 (Company) ^[2]	Undisclosed ^[2]	Free ^[3]
Separate Charge for use of Specialized Developer Tools (e.g., Metal)	None ^[3]	No Change	?	None ^[1]	Yes (e.g., Visual Studio Premium Options) ^[3]	None ^[3]	Yes (e.g., Visual Studio Premium Options for Xbox Live) ^[3]	Undisclosed ^[2]	N/A
Review of Own Store Content ^[B]	Free App Review ^[4]	No Change	?	Free App Review ^[3]	Free App Review ^[4]	Free App Review ^[4]	Free App Review ^[4]	Free App Review ^[2]	Free App Review ^[4]
Review of Non-Store Content	N/A	No Change	?	N/A	N/A	Notarization ^[5]	N/A	N/A	N/A
Commissions on Developers’ Monetization Strategies									
Commission on Paid Apps	30% ^[5]	<30% Commission	30%	15% for first \$1 M, 30% above \$1 M ^[4]	15% apps, 12% games ^[5]	30% Commission ^[6]	30% console games, 12% PC games ^[5]	30% ^[3]	30% ^[5]
Commission on In-App Purchases	30% ^[5]	<30% Commission	30%	15% for first \$1 M, 30% above \$1 M ^[4]	15% apps, 12% games ^[5]	30% Commission ^[6]	30% console games, 12% PC games ^[5]	30% ^[3]	30% ^[5]
Commission on subscriptions	30% year 1, 15% after ^[6]	<30% year 1, < 15% after	?	30% year 1, 15% after ^[5]	Headline Rate	30% year 1, 15% after ^[6]	Headline Rate	Headline Rate	Headline Rate
Policies Regarding Cross-Platform Content	No Commission for some types of content ^[7] (Reader Rule, Multiplatform Rule)	No Change	?	N/A	N/A	No Commission for some types of content ^[7] (Reader Rule, Multiplatform Rule)	N/A	Cross-Platform Revenue Share; Limited transfer of digital content allowed ^[4]	N/A
Commission on In-App Ads ^[C]	None ^[8]	No Change	?	None ^[7]	None ^[5]	None ^[8]	None	Upon Agreement ^[5]	40% ^[6]
Commission rates for Small Developers (e.g., Small Business Program)	15% ^[9]	<15%	?	15% ^[8]	Headline Rate	15% ^[9]	Headline Rate	Headline Rate	Headline Rate
Other Special Commission Rates for Developers	15% (Video Partner Program) ^[10]	No Change	?	Discounts for largest developers ^[9]	N/A	N/A	N/A	N/A	N/A

Notes:

[A] Only required fees have been included.

[B] “Free App Review” indicates that the developer agreement and publicly available sources either explicitly state that no charge is levied or imply this by not stating an associated cost

[C] Blackberry collected a commission on its Blackberry Ad Services; Amazon collects a commission on its Unified Ad Marketplace services.

[D] Includes all apps that are free to download, regardless of if in-app purchases are included.

[E] “User Choice” indicates that the platform currently allows, or has active plans to allow, users to opt-out of data tracking.

[F] “Limited” indicates that users have the option to restrict cross-app data gathering by adjusting settings.

[G] N/A indicates insufficient information.

Exhibit 5.B: Pricing Strategies of Two-Sided Platforms Non-OS Developer Benchmarks

Policy Consideration	Apple’s Pricing Strategies			Potential Non-OS Developer Benchmarks’ Pricing Strategies				
	Actual World	Plaintiffs’ But-For World	Likely But-For World	Steam	Galaxy Store	Tencent My App	Amazon App Store	Epic Games Store and Unreal Engine
Access to IP and Distribution on Store								
Fee to Access Developer Environment ^[A] (e.g., Xcode)	Free ^[1]	No Change	?	Free ^[1]	Free ^[1]	N/A	Free ^[1]	Free ^[1]
Fee to Distribute on Store (e.g., Developer Program Fee)	\$99 / Year (Individual) \$299 / Year (Enterprise) ^[2]	No Change	?	\$100 per game ^[2]	Free ^[2]	Free ^[1]	Free ^[2]	Free ^[2]
Separate Charge for use of Specialized Developer Tools (e.g., Metal)	None ^[3]	No Change	?		None ^[1]	N/A	None ^[1]	5% UE Royalty ^[2]
Review of Own Store Content ^[B]	Free App Review ^[4]	No Change	?	Part of \$100 per game fee ^[2]	Free App Review ^[2]	Free App Review ^[1]	Free App Review ^[3]	Free App Review ^[2]
Review of Non-Store Content	N/A	No Change	?	N/A	N/A	N/A	N/A	N/A
Commissions on Developers’ Monetization Strategies								
Commission on Paid Apps	30% ^[5]	<30% Commission	30%	30% if game revenue < \$10 M, 25% if game revenue \$10-50 M, 20% if game revenue > \$50 M ^[4]	30% ^[3]	55% (games) ^[2]	30% ^[4]	12% ^[3]
Commission on In-App Purchases	30% ^[5]	<30% Commission	30%	30% ^[4]	30% ^[3]	N/A	30% ^[4]	12% ^[4]
Commission on subscriptions	30% year 1, 15% after ^[6]	<30% year 1, < 15% after	?	Headline Rate	Headline Rate	Headline Rate	20% for Movie & TV, 30% ^[4]	Headline Rate
Policies Regarding Cross-Platform Content	No Commission for some types of content ^[7] (Reader Rule, Multiplatform Rule)	No Change	?	N/A	N/A	N/A	N/A	N/A
Commission on In-App Ads ^[C]	None ^[8]	No Change	?	N/A	None ^[3]	55% (games) ^[3]	10% ^[5]	N/A
Commission rates for Small Developers (e.g., Small Business Program)	15% ^[9]	<15%	?	Headline Rate (30%) ^[4]	Headline Rate	Headline Rate	20% ^[6]	Headline Rate
Other Special Commission Rates for Developers	15% (Video Partner Program) ^[10]	No Change	?	N/A	Upon Agreement ^[3]	30% for games by Netease ^[4]	Discount for Large Developers ^[7]	N/A

Notes:

[A] Only required fees have been included.

[B] “Free App Review” indicates that the developer agreement and publicly available sources either explicitly state that no charge is levied or imply this by not stating an associated cost

[C] Blackberry collected a commission on its Blackberry Ad Services; Amazon collects a commission on its Unified Ad Marketplace services.

[D] Includes all apps that are free to download, regardless of if in-app purchases are included.

[E] “User Choice” indicates that the platform currently allows, or has active plans to allow, users to opt-out of data tracking.

[F] “Limited” indicates that users have the option to restrict cross-app data gathering by adjusting settings.

[G] N/A indicates insufficient information.

Exhibit 5.C: Pricing Strategies of Two-Sided Platforms OS Developer Benchmarks: Other Considerations

Policy Consideration	Apple’s Pricing Strategies			Potential OS Developer Benchmarks’ Pricing Strategies					
	Actual World	Plaintiffs’ But-For World	Likely But-For World	Google Play	Microsoft Store (Windows PC)	Mac App Store	Microsoft Store (Xbox)	PlayStation	BlackBerry ^[11]
Scope of Apps									
Primary Categories of Apps Transacted	All	No Change	?	All	All	All	Games	Games	All
Allow Free Apps - % Free ^[D]	Yes - 93.4% ^[11]	No Change	?	Yes - 96.9% ^[10]	Yes - N/A ^[6]	Yes - N/A ^[10]	Yes - N/A ^[6]	Yes - 2.3% ^[6]	Yes - N/A ^[7]
User Privacy									
Data Gathering by Third Parties ^[E]	Allowed with disclosure ^[12]	No Change	?	Allowed ^[11]	User Choice ^[7]	Allowed with disclosure ^[11]	Allowed ^[7]	Limited ^[7]	Allowed ^[8]
Cross-App Data Gathering ^[F]	User Choice ^[13]	No Change	?	Limited ^[11]	Not specified ^[7]	User Choice ^[12]	N/A	Limited ^[7]	N/A
Tools for Facilitating App Discovery									
Search Ads	Paid Service ^[14]	No Change	?	Paid Service ^[12]	N/A	N/A	N/A	N/A	N/A
Curation of Featured Apps	Free ^[15]	No Change	?	No Fee Indicated ^[13]	No Fee Indicated ^[8]	No Fee Indicated ^[13]	No Fee Indicated ^[8]	\$25,000 for increased visibility ^[8]	Free, with optional nomination ^[9]
Facilitation of Payments / Pricing Guidelines									
Minimum Price	\$0.99 ^[16]	No Change	?	\$0.99 ^[14]	\$0.99 ^[6]	\$0.99 ^[14]	\$0.99 ^[9]	Price Set by Sony ^[9]	\$0.99 ^[10]
Pre-Set Price Tiers	Yes ^[16]	No	?	No	Yes ^[6]	Yes ^[14]	Yes ^[9]	Price Set by Sony ^[9]	Yes ^[10]
Incentives for consumer participation									
Subsidies or Price Reductions	Decided by developer ^[17]	No Change	?	Decided by developer ^[15]	Decided by developer ^[9]	Decided by developer ^[15]	Decided by developer ^[10]	Decided by platform ^[9]	N/A
Exclusive Deals	N/A	No Change	?	N/A	N/A	N/A	Yes ^[11]	Yes ^[10]	N/A

Notes:

[A] Only required fees have been included.

[B] “Free App Review” indicates that the developer agreement and publicly available sources either explicitly state that no charge is levied or imply this by not stating an associated cost

[C] Blackberry collected a commission on its Blackberry Ad Services; Amazon collects a commission on its Unified Ad Marketplace services.

[D] Includes all apps that are free to download, regardless of if in-app purchases are included.

[E] “User Choice” indicates that the platform currently allows, or has active plans to allow, users to opt-out of data tracking.

[F] “Limited” indicates that users have the option to restrict cross-app data gathering by adjusting settings.

[G] N/A indicates insufficient information.

Exhibit 5.D: Pricing Strategies of Two-Sided Platforms Non-OS Developer Benchmarks: Other Considerations

Policy Consideration	Apple’s Pricing Strategies			Potential Non-OS Developer Benchmarks’ Pricing Strategies				
	Actual World	Plaintiffs’ But-For World	Likely But-For World	Steam	Galaxy Store	Tencent My App	Amazon App Store	Epic Games Store and Unreal Engine
Scope of Apps								
Primary Categories of Apps Transacted	All	No Change	?	Games	All	All	All	Games
Allow Free Apps - % Free ^[D]	Yes - 93.4% ^[11]	No Change	?	Yes - 7.5% ^[6]	Yes - N/A	Yes- N/A	Yes - 77.9% ^[8]	Yes - 9.2% ^[5]
User Privacy								
Data Gathering by Third Parties ^[E]	Allowed with disclosure ^[12]	No Change	?	Allowed ^[7]	Allowed ^[4]	Allowed and unlisted ^[1]	User Choice ^[4]	Not allowed ^[6]
Cross-App Data Gathering ^[F]	User Choice ^[13]	No Change	?	Limited ^[8]	N/A	Allowed and unlisted ^[1]	User Choice ^[4]	Not allowed ^[6]
Tools for Facilitating App Discovery								
Search Ads	Paid Service ^[14]	No Change	?	Not allowed ^[9]	N/A	Paid Service ^[5]	N/A	N/A
Curation of Featured Apps	Free ^[15]	No Change	?	No Fee Indicated ^[9]	No Fee Indicated ^[5]	Paid Service ^[5]	No Fee Indicated ^[9]	No fee Indicated ^[7]
Facilitation of Payments / Pricing Guidelines								
Minimum Price	\$0.99 ^[16]	No Change	?	None ^[10]	None ^[6]	N/A	\$0.99 ^[10]	N/A
Pre-Set Price Tiers	Yes ^[16]	No	?	No	Price points options set by Samsung ^[6]	N/A	No ^[10]	No ^[8]
Incentives for consumer participation								
Subsidies or Price Reductions	Decided by developer ^[17]	No Change	?	By Platform and Developer ^[11]	Decided by Developer ^[7]	N/A	Decided by Developer ^[11]	Free subsidized games ^[9]
Exclusive Deals	N/A	No Change	?	N/A	N/A	Yes ^[5]	N/A	Yes ^[10]

Notes:

[A] Only required fees have been included.

[B] “Free App Review” indicates that the developer agreement and publicly available sources either explicitly state that no charge is levied or imply this by not stating an associated cost

[C] Blackberry collected a commission on its Blackberry Ad Services; Amazon collects a commission on its Unified Ad Marketplace services.

[D] Includes all apps that are free to download, regardless of if in-app purchases are included.

[E] “User Choice” indicates that the platform currently allows, or has active plans to allow, users to opt-out of data tracking.

[F] “Limited” indicates that users have the option to restrict cross-app data gathering by adjusting settings.

[G] N/A indicates insufficient information.

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Exhibit 5: Sources

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APPENDIX A: CURRICULUM VITAE

Richard Schmalensee

**Howard W. Johnson Professor of Management, Emeritus
Dean Emeritus, MIT Sloan School of Management
Professor of Economics, Emeritus
Massachusetts Institute of Technology**

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EDUCATION:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
S.B., Economics, Politics and Science, 1965
Ph.D., Economics, 1970

EMPLOYMENT:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
2012- Howard W. Johnson Professor of Management, Emeritus, and
Professor of Economics, Emeritus
2007-12 Howard W. Johnson Professor of Management
2001-07 John C Head III Dean, MIT Sloan School of Management
1998-00 Dean, MIT Sloan School of Management (Interim, July-October 1998)
1996-98 Deputy Dean, MIT Sloan School of Management
1991-99, Director, MIT Center for Energy and Environmental Policy Research
2008-12
1988-99 Gordon Y Billard Professor of Management
1986- 12 Professor, Department of Economics
1979- 12 Professor, MIT Sloan School of Management
1977-79 Associate Professor, MIT Sloan School of Management
1970 Assistant Professor, MIT Sloan School of Management (Spring)
1967-69 Instructor, MIT Sloan School of Management

PRESIDENT'S COUNCIL OF ECONOMIC ADVISERS
1989-91 Member
1967 Junior Staff Economist (Summer)

UNIVERSITY OF CALIFORNIA, SAN DIEGO
1974-77 Associate Professor, Department of Economics
1970-74 Assistant Professor, Department of Economics

VISITING APPOINTMENTS:

2008 Executive in Residence, Rady School of Management; U. of California, San Diego (Winter)
2007 Distinguished Visiting Scholar, Tuck School of Business, Dartmouth College (Fall)
1985-86 Visiting Professor, Harvard Business School
1985 Visiting Professor, CORE, University of Louvain, Belgium (Spring)
1980-81 Visiting Scholar, Department of Economics, Harvard University
1973-74 Visiting Associate Professor and Research Fellow, Department of Economics,
University of Louvain, Belgium

EDITORIAL SERVICE:

Editor in Chief, 2005-08; Chairman, Editorial Advisory Board, 2008-: *Competition Policy International*
Editorial Board: *Journal of Economics and Management Strategy*, 1992-98
Associate Editor: *Journal of Economic Perspectives*, 1992-98
Associate Editor: *International Journal of Industrial Organization*, 1982-89
Board of Editors: *American Economic Review*, 1982-86
Founding Editor, 1978-89; Co-Editor, 1989-: MIT Press Series, *Regulation of Economic Activity*
Associate Editor, 1977-81; Board of Editors, 1981-89: *Journal of Industrial Economics*

PROFESSIONAL ASSOCIATIONS:

American Economic Association: Committee on Government Relations, 2009-12; Executive Committee, 1993-95; Budget Committee, 1993-95; Nominating Committee, 1987; Advisory Committee on Meetings Program, 1986, 1989, 1994
Econometric Society: Chair, Local Arrangements Committee, 1985 World Congress; Chair, Program Committee, 1980 North American Fall Meeting; Program Committee, 1980 World Congress
Second World Congress of Environmental Economists, Program Committee, 2002

CONSULTATION AND GOVERNMENT SERVICE (SELECTED):

Global Economics Group, Director, 2011-
National Climate Assessment Development & Advisory Committee, 2011-14
LECG, LLC: Director, 2004-2011
National Academies/National Research Council: Panel on Transportation and a Sustainable Environment, 1994-97; Committee on National Statistics, 1998-2001; Panel on Cost-of-Living Indexes, 1999-2001; Coordinating Committee on the Transition to Sustainability, 2000-2001; Committee on America’s Climate Choices, 2008-2011; Committee for a Study of Freight Rail Transportation and Regulation (Chair), 2014-15; Committee on the Social Cost of Carbon, 2015-16
U.S. Environmental Protection Agency: Environmental Economics Advisory Committee, 1992-96, 1998; Clean Air Act Compliance Analysis Council, 1992-98, Chairman 1992-96
Antitrust Division, U.S. Department of Justice, consultant, 1991-92 (1992 Merger Guidelines)
NERA Economic Consulting: Special Consultant 1981-89, 1991-2004
Bureau of Economics, U.S. Federal Trade Commission: consultant, 1972-81 (Antitrust Policy)

AWARDS AND OTHER PROFESSIONAL ACTIVITIES (SELECTED):

Asia School of Business, Board of Governors, 2015- (Co-Chair 2015-18)
Associate Scholar, Harvard Environmental Economics Program, 2013-
Director, National Bureau of Economic Research, 2013- (Executive Committee 2018-)
Chicago Booth IGM Economic Experts Panel, 2012-
Distinguished Fellow, Industrial Organization Society, 2012
John Kuszczek Memorial Lecture, Bank of Canada, 2011
Energy Board Member, Bipartisan Policy Center, 2011-13
Stackelberg Lecture, University of Milan, Bicocca, 2010
Keynote Speaker, World Congress of Environmental and Resource Economists, 2010
Director, Resources for the Future, 2009- (Chairman, 2014-)
Master Class, Rafael del Pino Foundation, Madrid, 2009
Carpenter Lecture, Babson College, 2008
J.-J. Laffont Lecture, CRESSE Summer School, Greece, 2008
Member, National Commission on Energy Policy, 2006-2010
Director, International Data Group, 2004-2017
European Investment Bank Lecture, European University Institute, Florence, 2002
Director, MFS Investment Management, 2002-2004
Advisory Council, Tsinghua School of Economics and Management, 2001-07

Fathauer Lecture in Political Economy, University of Arizona, 2000
Director, International Securities Exchange, 2000-2009
Member, International Academy of Management, 1998-
Member, American Academy of Arts and Sciences, 1995-
Edward A. Hewett Prize, American Association for the Advancement of Slavic Studies (with P.L. Joskow and N. Tsukanova), 1995
Revista de Análisis Económico Lecture, Econometric Society Latin American Meeting, 1994
Director, MIT Press, 1994-2007
Research Associate: National Bureau of Economic Research, 1992-2013
Director: Long Island Lighting Company, 1992-98
Donald Gilbert Memorial Lecture, University of Rochester, 1992
American Council for Capital Formation Center for Policy Research: Board of Directors, 1991-2010;
Environmental Policy Fellow, 1997-98
Fellow, Econometric Society, 1982-
Invited Speaker, Econometric Society World Congress, 1980

BOOKS WRITTEN:

The Economics of Advertising (Vol. 80, Contributions to Economic Analysis), Amsterdam: North-Holland, 1972.

Applied Microeconomics: Problems in Estimation, Forecasting and Decision-Making, San Francisco: Holden-Day, 1973.

An Introduction to Applied Macroeconomics (with E. Kuh), Amsterdam: North-Holland, 1973. Japanese edition, 1975.

The Control of Natural Monopolies, Lexington: D.C. Heath (Lexington Books), 1979.

Markets for Power: An Analysis of Electric Utility Deregulation (with P. L. Joskow), Cambridge: MIT Press, 1983.

Economics, 2nd Ed. (with S. Fischer and R. Dornbusch), New York: McGraw-Hill, 1988. Multiple foreign language editions.

Paying with Plastic: The Digital Revolution in Buying and Borrowing (with D.S. Evans), Cambridge: MIT Press, 1999. Second edition, 2005; Chinese edition, 2006; Korean Edition, 2011.

Markets for Clean Air: The U.S. Acid Rain Program (with A.D. Ellerman, P.L. Joskow, J.P. Montero, and E.M. Bailey), Cambridge: Cambridge University Press, 2000.

Did Microsoft Harm Consumers? Two Opposing Views (with D.S. Evans; F.M. Fisher and D.L. Rubinfeld), Washington: AEI Press, 2000.

Invisible Engines: How Software Platforms Drive Innovation and Create Value (with D.S. Evans and A. Hagiu), Cambridge: MIT Press, 2006. Korean edition, 2008; Chinese edition, 2010.

Catalyst Code (with D.S. Evans), Boston: Harvard Business School Press, 2007. Korean edition, 2008; Polish edition, 2010; Chinese edition, 2011.

Matchmakers (with D.S. Evans), Boston: Harvard Business School Press, 2016. French and Korean editions 2017, Chinese and Japanese editions 2018, Vietnamese edition 2019.

Antitrust Analysis of Platform Markets: Why the Supreme Court Got It Right in American Express (with D.S. Evans), Boston: Competition Policy International, 2019.

REPORTS CHAIRED

The Future of the Electric Grid (with J.G. Kassakian), Cambridge: MIT Energy Initiative, 2011.

The Future of Solar Energy (with V. Bulovic), Cambridge: MIT Energy Initiative, 2015.

Modernizing Freight Rail Regulation, Washington: Transportation Research Board, 2015.

BOOKS EDITED:

The Empirical Renaissance in Industrial Economics (ed., with T. F. Bresnahan), Oxford: Basil Blackwell, 1987.

Handbook of Industrial Organization, Vols. I & II (ed., with R. D. Willig), Amsterdam: North-Holland, 1989.

Management: Inventing and Delivering Its Future (ed., with T.A. Kochan), Cambridge: MIT Press, 2003. Chinese and Korean editions, 2004.

Harnessing Renewable Energy in Electric Power Systems (ed., with B. Moselle and J. Padilla), Washington/London: RFF Press, 2010.

The Causes and Effects of Deregulation, 2 Vols. (ed., with P.W. MacAvoy), Cheltenham, UK: Edward Elgar, 2014

JOURNAL ARTICLES:

"Regulation and the Durability of Goods." *Bell Journal of Economics and Management Science*, 1 (Spring 1970): 54-64.

"Consumer's Surplus and Producer's Goods." *American Economic Review*, 61 (September 1971): 682-687.

"A Note on Monopolistic Competition and Excess Capacity." *Journal of Political Economy*, 80 (May/June 1972): 586-591.

"Option Demand and Consumer's Surplus: Valuing Price Changes Under Uncertainty." *American Economic Review*, 62 (December 1972): 813-824.

"A Note on the Theory of Vertical Integration." *Journal of Political Economy*, 81 (March/April 1973): 442-449.

"Brand Loyalty and Barriers to Entry." *Southern Economic Journal*, 40 (April 1974): 579-588.

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- "Continuity and Change in the Economics Industry." *Economic Journal*, 101 (January 1991): 115-121. Reprinted in *The Future of Economics* (J.D. Hey, ed.), Oxford: Basil Blackwell, 1992, pp. 115-121.
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- "Comparing Greenhouse Gases for Policy Purposes." *Energy Journal*, 14 (1993): 245-255.
- "Symposium on Global Climate Change." *Journal of Economic Perspectives*, 7 (Fall 1993): 3-10.
- "Competition Policy in Russia During and After Privatization" (with P.L. Joskow and N. Tsukanova). *Brookings Papers on Economic Activity, Microeconomics*, 1994: 301-374. [Awarded the 1995 Edward A. Hewett Prize by the American Association for the Advancement of Slavic Studies.]
- "Economic Aspects of Payment Card Systems and Antitrust Policy Toward Joint Ventures" (with D.S. Evans). *Antitrust Law Journal*, 63 (Spring 1995): 861-901.
- "The Benefits of Releasing the Bell Companies from the Interexchange Restrictions" (with P.S. Brandon). *Managerial and Decision Economics*, 16 (July-August 1995): 349-364.
- "Privatization in Russia: What Should Be a Firm?" (with P.L. Joskow). *International Journal of the Economics of Business*, 2 (1995): 297-327. Reprinted in *Transaction Cost Economics: Recent Developments* (C. Menard, ed.), Brookfield, VT: Edward Elgar, 1997, pp. 86-126.
- "What Have We Learned About Privatization and Regulatory Reform?" *Revista de Análisis Económico*, 10 (November 1995): 21-39. (Remarks in Roundtable Discussion, pp. 303-312.)
- "Is There a Role for Benefit-Cost Analysis in Environmental Health and Safety Regulation?" (with K.J. Arrow, M.L. Cropper, G.C Eads, R.W. Hahn, L.B. Lave, R.G. Noll, P.R. Portney, M. Russell, V.K. Smith, and R.N. Stavins). *Science*, 272 (12 April 1996): 221-222. Reprinted in *Economics of the Environment: Selected Readings*, 4th Ed. (R.N. Stavins, ed.), New York: Norton, 1999, pp. 319-324.
- "World Carbon Dioxide Emissions: 1950-2050" (with T.M. Stoker and R.A. Judson). *Review of Economics and Statistics*, 80 (February 1998): 15-27.
- "The Political Economy of Market-Based Environmental Policy: The US Acid Rain Policy" (with P.L. Joskow). *Journal of Law and Economics*, 41 (April 1998): 37-83. Reprinted in *Economics of the Environment: Selected Readings*, 4th Ed. (R.N. Stavins, ed.), New York: Norton, 1999, pp. 603-645.
- "Some Economic Principles for Guiding Antitrust Policy Towards Joint Ventures" (with H. Chang and D.S. Evans). *Columbia Business Law Review*, 1998 (1998): 223-329.
- "An Analysis of the Welfare Effects of Long-Distance Market Entry by an Integrated Access and Long-Distance Provider" (with P.J. Hinton, J.D. Zona, and W.E. Taylor). *Journal of Regulatory Economics*, 13 (March 1998): 183-196.

- “An Interim Evaluation of Sulfur Dioxide Emissions Trading” (with P.L. Joskow, A.D. Ellerman, J.-P. Montero, and E.M Bailey). *Journal of Economic Perspectives*, 12 (Summer 1998): 53-68. Reprinted in *Economics of the Environment: Selected Readings*, 4th Ed. (R.N. Stavins, ed.), New York: Norton, 1999, pp. 455-471.
- “The Market for Sulfur Dioxide Emissions” (with P.L. Joskow and E.M Bailey). *American Economic Review*, 88 (September 1998): 669-685.
- “Household Gasoline Demand in the United States” (with T.M. Stoker). *Econometrica*, 67 (May 1999): 645-662.
- “Economic Development and the Structure of the Demand for Commercial Energy” (with R.A. Judson and T.M. Stoker). *Energy Journal*, 20 (1999): 29-57.
- “Bill Baxter in the Antitrust Arena: An Economist’s Appreciation.” *Stanford Law Review*, 51 (May 1999): 1317-1332.
- “Antitrust Issues in Schumpeterian Industries.” *American Economic Review*, 90 (May 2000): 192-196.
- “An Analysis of the Government’s Economic Case in *U.S. v. Microsoft*” (with D.S. Evans and A.L. Nichols). *Antitrust Bulletin*, 46 (Summer 2001), pp. 163-251. Reprinted in *Microsoft, Antitrust and the New Economy: Selected Essays* (D.S. Evans, ed.), Boston: Kluwer: 2002.
- “Payment Systems and Interchange Fees,” *Journal of Industrial Economics*, 50 (June 2002): 103-122.
- “Sunk Costs and Antitrust Barriers to Entry,” *American Economic Review*, 94 (May 2004): 471-475.
- “A Survey of the Economic Role of Software Platforms in Computer-Based Industries,” *CESifo Economic Studies*, 51 (2005): 189-224. (Reprinted, with minor changes, as “Software Platforms.” In *Industrial Organization and the Digital Economy* (G. Illig and M. Peitz, eds.). Cambridge: MIT Press, 2006, pp. 31-70.)
- “*United States v. Microsoft*: Did Consumers Win?” (with D.S. Evans and A.L. Nichols). *Journal of Competition Law and Economics*, 1 (September 2005): 497-539
- “The Industrial Organization of Markets with Two-Sided Platforms” (with D.S. Evans), *Competition Policy International*, 3 (Spring 2007): 151-179. Also in W.D. Collins, ed., *Issues in Competition Law and Policy*, Chicago: American Bar Association, 2008, pp. 667-693.
- “Pricing Patents for Licensing in Standard-Setting Organizations: Making Sense of *FRAND* Commitments” (with A. Layne-Farrar and A.J. Padilla), *Antitrust Law Journal*, 74 (2007): 671-706.
- “Standard-Setting, Innovation Specialists, and Competition Policy,” *Journal of Industrial Economics*, 57 (September 2009): 526-52.
- “Failure to Launch: Critical Mass in Platform Businesses” (with D.S. Evans), *Review of Network Economics*, 9 (2010), Issue 4, Article 1 (26 pages).
- “Jeffrey Rohlfs’ 1974 Model of Facebook: An Introduction,” *Competition Policy International*, 7 (Spring 2011): 301-12.
- “Why is Platform Pricing Generally Highly Skewed?” *Review of Network Economics*, 10 (December 2011), Issue 4, Article 1, 11 pages.
- “Evaluating Policies to Increase the Generation of Electricity from Renewable Energy,” *Review of Environmental Economics and Policy*, 6 (Winter 2012): 45-64.
- “On a level with Dentists?” Reflections on the Evolution of Industrial Organization.” *Review of Industrial Organization*, 41 (November 2012): 157-79.

- “From ‘Green Growth’ to Sound Policies: An Overview,” *Energy Economics*, 34 (Supplement 1, November 2012): S2-S6.
- “The SO₂ Allowance Trading System: The Ironic History of a Grand Policy Experiment,” (with R.N. Stavins), *Journal of Economic Perspectives*, 27 (Winter 2013): 103-22.
- “An Instant Classic: Rochet & Tirole, Platform Competition in Two-Sided Markets,” *CPI Journal*, 10:2 (Autumn 2014): 175-180.
- “Pricing the Razor: A Note on Two-Part Tariffs,” *International Journal of Industrial Organization*, 42 (September 2015): 19-22.
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- “The Staggers Act at 35: Railroad Economics and Regulation” (with W.W. Wilson), *Review of Industrial Organization*, 49:2 (2016): 127-131.
- “Modernizing U.S. Freight Rail Regulation” (with W.W. Wilson), *Review of Industrial Organization*, 49:2 (2016): 135-159.
- “Socialism for Red States in the Electric Utility Industry,” *Journal of Competition Law and Economics*, 12:3 (September 2016), 477-494.
- “Reforming the U.S. Coal Leasing Program” (with K. Gillingham et al), *Science*, 354: 3616 (December 2, 2016), 1096-1098.
- “Lessons Learned from Three Decades of Experience with Cap-and-Trade” (with R. Stavins), *Review of Environmental Economics and Policy*, 11: 1 (Winter 2017): 59-79.
- “The Design of Environmental Markets: What Have We Learned from Experience with Cap and Trade?” (with R. Stavins), *Oxford Review of Economic Policy*, 33: 4 (Winter 2017): 572-588.
- “Applying the Rule of Reason to Two-Sided Platform Businesses” (with D.S. Evans), *University of Miami Business Law Review*, 26: 1 (April 2018), 15 pp. Available at <https://repository.law.miami.edu/umblr/vol26/iss2/3>.
- “Puzzles and Surprises in Employment and Productivity in U.S. Manufacturing After the Great Recession,” *International Productivity Monitor*, No. 35 (Fall 2018) 1-23.
- “Policy Evolution under the Clean Air Act” (with R.N. Stavins), *Journal of Economic Perspectives*, 33:4 (Fall 2019): 27-50.
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- "George Stigler's Contributions to Microeconomics and Industrial Organization." In *The New Palgrave*, Vol. 4 (J. Eatwell, M. Milgate, and P. Newman, eds.), New York: Macmillan, 1987, pp. 499-500.
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APPENDIX B: EXPERT TESTIMONY

TESTIMONY:

- U.S. Federal Trade Commission, *In re Kellogg Company et al*, Docket No. 8883. (Deposition and hearing testimony: July 25 - August 12, 1977 for FTC staff on a range of issues.)
- U.S. District Court for the Northern District of California, *In Re Data General Corporation*, MDL Docket No. 369-WHO, April 21, 1981. (Deposition and trial testimony on market power.)
- U.S. Tax Court, *Ciba-Geigy Corporation v. Commissioner of the Internal Revenue Service*, Docket No. 2831-78. (Trial testimony for petitioner on reasonable patent royalties, October 1, 1983.)
- U.S. Federal Communications Commission, *In the Matter of Long-Run Regulation of AT&T's Basic Domestic Interstate Services*, CC Docket No. 83-1147. (Statement on costs of asymmetric regulation submitted on behalf of AT&T, April 2, 1984.)
- U.S. Federal Communications Commission, Third Computer Inquiry, CC Docket No. 85-229. (Paper entitled "The Regulatory Framework Proposed in Computer III" submitted on behalf of AT&T, November 13, 1985.)
- U.S. District Court for the Central District of California, *USAIR, Inc., et al., vs. American Airlines, Inc., and United Air Lines, Inc.*, CV No. 84-8918 ER (Tx). Deposition regarding air passenger computer reservation systems antitrust litigation, December 15, 1987 and December 16, 1987.
- Oregon Circuit Court for Douglas County, *Emerald People's Utility District v. PacifiCorp*, Docket No. L87-1282. (Trial testimony for defendant on the economic effects of a dam condemnation, June 3, 1988.)
- U.S. Senate, Committee on Banking, Housing, and Urban Affairs, September 21, 1989. (Confirmation hearing.)
- U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Energy and Power, October 11, 1989. (Administration testimony on the emissions allowance trading provisions of its acid rain proposal.)
- U.S. Congress, Joint Economic Committee, February 8, 1990. (With Michael J. Boskin and John B. Taylor; Administration testimony on the 1990 *Economic Report of the President*.)
- U.S. Senate, Committee on Energy and Natural Resources, March 26, 1990. (Administration testimony on the world oil outlook.)
- U.S. Senate, Committee on Energy and Natural Resources, Subcommittee on Energy Research and Development, May 8, 1990. (Administration testimony on the applicability of new source review to existing steam electric generating units, the "WPECo problem.")
- U.S. Congress, Joint Economic Committee, February 12, 1991. (With Michael J. Boskin and John B. Taylor; Administration testimony on the 1991 *Economic Report of the President*.)
- U.S. Senate, Committee on Finance, Subcommittee on Social Security and Family Policy, March 4, 1991. (Administration testimony on measuring the status of children.)
- U.S. Senate, Committee on Energy and Natural Resources, March 18, 1991. (Administration testimony on the applicability of new source review to existing steam electric generating units, the "WPECo problem")
- Massachusetts Department of Public Utilities, *Investigation into Environmental Externalities*, D.P.U. Docket No. 91-131. (Written testimony (October 4 and December 13, 1991), cross-examination (January 28, 1992) on environmental adders.)

- U.S. District Court, *Visa U.S.A., Inc. v. SCFC ILC, Inc. d/b/a Mountainwest Financial, Inc.*, (Deposition and trial testimony before a jury, October 1992, on denial of membership by a joint venture.)
- Federal Communications Commission (ET Docket 92-1000) on behalf of BellSouth Corporation, "Assigning PCS Spectrum: An Economic Analysis of Eligibility Requirements and Licensing Mechanisms," (with William E. Taylor), filed November 9, 1992.
- U.S. District Court for the Middle District of Florida, Orlando Division, *Florida Municipal Power Agency v. Florida Power and Light Company*, Case No. 92-35-CIV-PR:-3A22 (Deposition testimony on standards for the pricing of electricity transmission services, March 2, 1993.)
- Federal Communications Commission (Amendment of Part 90 of the commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems) PR docket No. 93-61 on behalf of PacTel Teletrac, "The Economics of Co-Channel Separation for Wideband Pulse Ranging Location Monitoring Systems," (with William E. Taylor), filed June 29, 1993.
- Federal Communications Commission (CC Docket 94-1) on behalf of the United States Telephone Association: "Comments on the USTA Pricing Flexibility Proposal," filed as Attachment 4 to the *United States Telephone Association* Comments, May 9, 1994, "Reply Comments: Market Analysis and Pricing Flexibility for Interstate Access Services," filed as Attachment 3 to the *United States Telephone Association Reply Comments*, June 29, 1994 (with William E. Taylor).
- Thompson Everett, Inc. v. National Cable Advertising, L.P., Cable Networks, Inc., and Cable Media Corporation*, U.S. District Court (E.D. Va.). (Expert report (with Linda McLaughlin), March 11, 1994 and deposition testimony, March 24, 1994 on behalf of defendants concerning the competitive effect of exclusive cable advertising representation contracts and their impact on plaintiff.)
- U.S. Federal Energy Regulatory Commission, *Revisions to Oil Pipeline Regulation Pursuant to the Energy Policy Act of 1992*, Docket No. RM93-11-000. (Paper entitled "An Economic Analysis of Oil Pipeline Markets" submitted on behalf of Sinclair Oil Corporation, January, 1994).
- Princeton Economics Group v. AT&T*, No. L-91-3221, in the Superior Court of New Jersey, Mercer County, Law Division (deposition testimony 1994).
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- U.S. District Court for the Northern District of Illinois Eastern Division, *In re: Brand Name Prescription Drugs Antitrust Litigation*, (Deposition, testimony on class certification, September 18, 1994.)
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- U.S. District Court (Southern District of New York), *Union Carbide Corporation v. Himont U.S.A., Inc., et al*, 95 Civ. 0134. Deposition (February 1, 1995) and trial (February 15-16, 1995) testimony for plaintiff on effects of injunctive relief.)

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- California Public Utilities Commission, (Investigation No. I.95-05-047), on behalf of Pacific Bell, “Incentive Regulation and Competition: Issues for the 1995 Incentive Regulation Review.” (with William E. Taylor and Timothy J. Tardiff), filed September 18, 1995.
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- Federal Communications Commission (CC Docket No. 96-0221) on behalf of NYNEX and Bell Atlantic, affidavit concerning the competitive effects of the proposed NYNEX-Bell Atlantic merger, filed October 23, 1996.
- Bell Atlantic Corporation, et. al. v. AT&T Corporation et. al.*, No. 5-96-CV45 U.S. District Court for Eastern District of Texas (Texarkana Division), Deposition January 8, 1997.
- Federal Communications Commission (CC Docket 96-262) in the matter of Access Charge Reform and Price Cap Performance Review for Local Exchange Carriers, “Economic Aspects of Access Reform,” with William Taylor, filed January 29, 1997.
- New York Public Service Commission on behalf of New York Telephone Company, “Competitive Effects of Allowing NYNEX to Provide InterLATA Services Originating in New York State,” public interest analysis of NYNEX’s proposed entry into in-region long distance service, (with William E. Taylor and Harold Ware), filed February 18, 1997.
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- Testimony on behalf of *Southwestern Bell* regarding its application to enter the long-distance telephone market in Oklahoma, February 13, 1998, and rebuttal, April 21, 1998.

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- U.S. v. Microsoft Corporation and State of New York, ex rel. v. Microsoft Corporation*, U.S. District Court for the District of Columbia, (Civil Action No. 98-1232 (TPJ) and No. 98-1233 (TPJ)), deposition testimony, October 1998.
- Bristol Technology, Inc. v. Microsoft Corporation*, U.S. District Court for the District of Connecticut, (CV-98-1657 (JCH)), deposition testimony and testimony at preliminary injunction hearing, October 1998, and October 1998.
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August 2021

Appendix C Materials Relied Upon

I. Complaints and Other Legal Documents

Brief for *Amici Curiae* Prof. David S. Evans and Prof. Richard Schmalensee in Support of Respondents, *State of Ohio et al. v. American Express Company et al.*, No. 16-1454, Supreme Court of the United States, January 23, 2018.

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Declaration of Philip W. Schiller in Support of Defendant Apple Inc.’s Opposition to Plaintiff’s Motion for a Preliminary Injunction, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, September 15, 2020.

Expert Class Certification Report of Professor Einer Elhauge, *Cameron et al. v. Apple Inc.*, No. 4:19-cv-03074-YGR, United States District Court for the Northern District of California, Oakland Division, June 1, 2021.

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APPENDIX D: ECONOMIC ANALYSIS OF IOS AND THE APP STORE AS A TWO-SIDED TRANSACTION PLATFORM

A. Two-Sided Platforms and Indirect Network Effects

230. In its *Ohio v. American Express* (“*Amex*”) decision, the Supreme Court noted that, according to economists, a “two-sided platform offers different products or services to two different groups who both depend on the platform to intermediate between them.”⁴³⁹ It cited a more complete description, based on my work, that two-sided platforms “serve distinct groups of customers who need each other in some way, and the core business of the two-sided platform is to provide a common (real or virtual) meeting place and to facilitate interactions between members of the two distinct customer groups.”⁴⁴⁰ For a platform to be attractive to both groups it seeks to serve, it must serve to reduce frictions that impede their desired interaction, and it must choose the prices it charges to both sides so as to make the platform attractive to both.
231. At its base, the two-sided platform is an ancient business model that traces its ancestry back to village matchmakers and through the organized marketplace linking lenders and traders on the docks of ancient Athens and Renaissance trade fairs linking merchants from different cities.⁴⁴¹ Advances in computation and communications technology since the early 1990s have made this model much more powerful, and many of the most valuable companies in the world – including Apple – operate two-sided platforms.⁴⁴²
232. *Amex* was the first Supreme Court case in which the courts referred to the economic literature on two-sided platforms that had developed since around 2000. The Supreme Court highlighted that indirect network effects are a key feature of two-sided platforms: “Two-sided platforms differ from traditional markets in important ways. Most relevant

⁴³⁹ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 2.

⁴⁴⁰ Evans, David S. and Richard Schmalensee, “Markets with Two-Sided Platforms,” *Issues in Competition Law and Policy (ABA Section of Antitrust Law)*, 1, 2008, pp. 667-693, at p. 667.

⁴⁴¹ Evans, David S. and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, Harvard Business Review Press, May 3, 2016, at pp. 199-201.

⁴⁴² Evans, David S. and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, Harvard Business Review Press, May 3, 2016, Ch. 3.

here, two-sided platforms often exhibit what economists call ‘indirect network effects.’”⁴⁴³

Indirect network effects refer to the situation in which the value realized by members of one group of customers of a platform is higher when they have access to more members of the other group of customers with whom they could productively interact.⁴⁴⁴ Successful two-sided platforms must ensure that there are a large number of participants on both sides of the platform and that transactions on the platform are as easy, safe, and reliable as possible.⁴⁴⁵

233. Because of indirect network effects, the newly powerful multi-sided platform business model is much more complex than the business model of a brick-and-mortar retailer or other single-sided business. Platforms must select pricing strategies, service provision, and rules of behavior so as to ensure balanced participation of the customer groups they serve. If a platform is required to alter one element of its overall strategy – pricing to one side or rules of behavior affecting another side, for instance – it may find it profit-maximizing to respond by altering several other elements of its strategy, with diverse impact on groups on both sides of its platform. Hence, even minor changes to a platform’s pricing strategy always require careful considerations from various viewpoints.

⁴⁴³ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 3.

⁴⁴⁴ Evans, David S. and Richard Schmalensee, *Matchmakers: The New Economics of Multisided Platforms*, Harvard Business Review Press, May 3, 2016, at p. 31 (“A network effect is *indirect* when the value of a matchmaker to one group of customers depends on how many members of a *different* group participate.”); Tucker, Catherine, “Network Effects and Market Power: What Have We Learned in the Last Decade?” *Antitrust*, 2018, pp. 72-79, at p. 72 (“Economists use ‘network effects’ to describe contexts in which a good or service offers increasing benefits the more users it has. Network effects can be direct—for example, a fax machine becomes more useful as other people also use fax machines. Network effects can also be indirect so that they flow across different sets of users. For example, Uber would not be a very useful app for a rider if there were no drivers using the platform. Similarly, drivers would not want to use the Uber app if no riders were using it.”).

⁴⁴⁵ “The ‘Sharing’ Economy: Issues Facing Platforms, Participants, and Regulators,” *Federal Trade Commission*, November 2016, available at https://www.ftc.gov/system/files/documents/reports/sharingeconomy-issues-facing-platforms-participants-regulators-federal-trade-commission-staff/p151200_ftc_staff_report_on_the_sharing_economy.pdf, at pp. 3-4 (“[A successful platform] must attract a large number of participants to both sides of the market, so that each participant has a substantial number of potential matches on the other side of the market (resulting in a ‘thick’ market). [...] [And] platforms must make transacting between strangers safe and reliable enough that buyers and sellers feel confident that their transaction will proceed as agreed.”).

234. To ensure participation on both sides, so that each side finds participation on the platform attractive because of participation by the other side, platforms must carefully choose the sets of prices on both sides. (They generally must also consider the services they provide to both sides and, as discussed below, the restrictions they impose as a condition of participation on both sides.) Platforms may charge access fees for the right to participate on the platform (e.g., the annual fee consumers pay to carry an American Express card) as well as usage fees for transactions (e.g., the percentage of each purchase made with an American Express card that merchants pay to American Express).⁴⁴⁶ Platforms’ price structures depend in part on the price elasticities of demand of the groups served. Like ordinary one-sided businesses, platforms will tend to charge higher prices, all else equal, to customers who are less sensitive to price, i.e., that have lower price elasticities of demand.⁴⁴⁷ In fact, it is common for one side of a two-sided platform to be charged less than marginal cost to encourage participation on that side, in order to make it attractive for the other side, which is charged above marginal cost, also to participate.⁴⁴⁸
235. But platforms also need to consider the patterns of indirect network effects. When indirect network effects are bi-directional, so that members of both groups are attracted by the presence of members of the other group, feedback between the groups tends to increase overall price sensitivity.⁴⁴⁹ Suppose a platform serves groups A and B and it increases price to group A. This will reduce participation by members of group A. That, in turn, will make the platform less attractive to members of group B and will accordingly reduce their

⁴⁴⁶ Rochet, Jean-Charles and Jean Tirole, “Two-Sided Markets: A Progress Report,” *RAND Journal of Economics*, 37(3), 2006, pp. 645-667, at p. 647 (“We distinguish between membership charges and usage charges [...] the platform charges a price or access charge a^S to the seller and a^B to the buyer for enabling the interaction. For example, American Express charges a merchant discount to the merchant, so $a^S > 0$, while the buyer pays nothing for using the American Express card, $a^B = 0$ [...] the platform may charge interaction independent fixed fees A^S and A^B . [...] For example, American Express charges yearly fees to cardholders ($A^B > 0$).”).

⁴⁴⁷ Niels, Gunnar, “Transaction versus Non-Transaction Platform: A False Dichotomy in Two-Sided Market Definition,” *Journal of Competition Law and Economics*, 15(2-3), 2019, pp. 327-357, at pp. 341-342.

⁴⁴⁸ Rysman, Mark, “The Economics of Two-Sided Markets,” *Journal of Economic Perspectives*, 23(3), 2009, pp. 125-143, at p. 130 (“Such seeming anomalies as price below marginal cost or even negative prices can easily arise in a two-sided market. For example, a platform might charge a price below cost on one side if those agents have a large price elasticity and their participation attracts a large number of participants on the other side who are relatively price inelastic”).

⁴⁴⁹ Evans, David S. and Richard Schmalensee, “Markets with Two-Sided Platforms,” *Issues in Competition Law and Policy (ABA Section of Antitrust Law)*, 1, 2008, pp. 667-693, at pp. 674-675.

participation. And the process continues: less participation from B will make the platform even less attractive to members of group A, a reduction in A’s participation will make the platform even less attractive to members of B, and so on. It is possible that the result will be that both groups completely drop off the platform. For modest price increases, the process will generally converge, and the decline in participation by A will be greater than A’s price sensitivity would imply: demand is, in effect, more elastic. In addition, participation by group B will have fallen.

236. Platforms often need to establish and enforce rules of behavior to prevent platform participants from reducing the value of the platform to members of the other group served.⁴⁵⁰ For instance, OpenTable suspends a user’s account if the user is a no-show for four reservations within a 12-month period.⁴⁵¹ That may be a mild inconvenience for some consumers, but it makes the platform more valuable to restaurants, and if more restaurants participate, the platform is more valuable to all consumers. Both eBay and Amazon Marketplace have detailed rules with which sellers must comply in order to retain access to these platforms.⁴⁵²
237. For example, eBay has a fee avoidance policy, where sellers are “prohibited from activities that avoid eBay fees, intentionally or not,” such as making offers to buy or sell outside of

⁴⁵⁰ See Evans, David, “Governing Bad Behavior by Users of Multi-Sided Platforms,” *Berkeley Technology Law Journal*, 27(2), 2012, pp. 1201-1250, at pp. 1203-1204. (“Multi-sided platforms create value by helping two or more different types of users, who could benefit from getting together, find and interact with each other, and exchange value [...] There are positive externalities between the multiple types of users. Platforms provide ways to promote these positive externalities and thereby create value for the community of users they serve. Whenever people and businesses get together, and in any community, there are many opportunities for people and businesses to behave badly and to thereby generate negative externalities. This bad behavior can reduce economic efficiency and in the extreme lead to the tragedy of the commons. Multi-sided platforms such as eBay develop governance systems to reduce this bad behavior and minimize negative externalities. This Article shows that multi-sided platforms develop systems of rules and penalties to manage many of the same kinds of problems that communities subject to public laws and regulations face. These platforms enforce such rules by exercising their property rights to exclude users from the platform. In some cases, the rules and penalties imposed by the platform are similar to, and in some cases close substitutes for, rules and penalties adopted by a public regulator.”).

⁴⁵¹ “OpenTable Terms of Use,” *OpenTable*, available at <https://www.opentable.com/legal/terms-and-conditions>, accessed on February 2, 2021.

⁴⁵² “eBay Rules and Policies,” *eBay Customer Service*, available at <https://www.ebay.com/help/policies/default/ebays-rules-policies?id=4205>, accessed on February 2, 2021; “Selling Policies and Seller Code of Conduct,” *Amazon Seller Central*, available at https://sellercentral.amazon.com/gp/help/external/G1801?language=en_US, accessed on February 2, 2021.

eBay or promoting sites or items that could be used by customers to order items outside of eBay.⁴⁵³ This policy is intended to prevent consumers from making purchases that are not eligible for eBay’s Money Back Guarantee, a service where consumers are fully refunded if the item they order does not arrive, is damaged, or does not match its listing.⁴⁵⁴ eBay also prohibits a seller’s employees or employers from bidding on its items to prevent the possibility of “shill bidding”—bidding on an item to artificially increase its price or perceived value.⁴⁵⁵ Moreover, eBay does not allow a seller to use third-party statements or logos that declare its “trustworthiness” or “reputation” in its listings, as they are hard to verify for buyers.⁴⁵⁶ Sellers are only allowed to make statements that guarantee the transaction or item, or ones that refer to easily verifiable information like the number of positive feedback ratings they have received on eBay.⁴⁵⁷ All these policies reduce the consumers’ risk when buying items through eBay, making it a more trustworthy and appealing platform to them. As having more consumers on eBay leads to an overall increase in the demand for eBay goods, these policies also indirectly benefit sellers.

238. Amazon Marketplace also has policies and a code of conduct for sellers. For example, sellers are not allowed to provide links or messages prompting customers to go to an external website or complete their transaction anywhere other than through Amazon.⁴⁵⁸ Sellers can only communicate with buyers through the Buyer-Seller Messaging system, and all communications must be necessary to fulfill the transaction or provide customer

⁴⁵³ “eBay Fee Avoidance Policy,” *eBay Customer Service*, available at <https://www.ebay.com/help/policies/selling-policies/selling-practices-policy/avoiding-ebay-fees-policy?id=4354>, accessed on February 2, 2021.

⁴⁵⁴ “eBay Money Back Guarantee Policy,” *eBay Customer Service*, available at <https://www.ebay.com/help/policies/ebay-money-back-guarantee-policy/ebay-money-back-guarantee-policy?id=4210>, accessed on February 2, 2021.

⁴⁵⁵ “eBay Fee Avoidance Policy,” *eBay Customer Service*, available at <https://www.ebay.com/help/policies/selling-policies/selling-practices-policy/avoiding-ebay-fees-policy?id=4354>, accessed on February 2, 2021.

⁴⁵⁶ “Third-party Endorsements Policy,” *eBay Customer Service*, available at <https://www.ebay.com/help/policies/listing-policies/thirdparty-endorsements-policy?id=4249>, accessed on February 2, 2021.

⁴⁵⁷ “Third-party Endorsements Policy,” *eBay Customer Service*, available at <https://www.ebay.com/help/policies/listing-policies/thirdparty-endorsements-policy?id=4249>, accessed on February 2, 2021.

⁴⁵⁸ “Selling Policies and Seller Code of Conduct,” *Amazon Seller Central*, available at https://sellercentral.amazon.com/gp/help/external/G1801?language=en_US, accessed on February 2, 2021.

service.⁴⁵⁹ Marketing communications are not allowed.⁴⁶⁰ Sellers are not allowed to have multiple accounts unless they have a legitimate business need (e.g., they own multiple brands with separate businesses or they make products for separate companies).⁴⁶¹ These policies ensure that sellers do not flood consumers with spam or duplicate offerings, making Amazon a more desirable platform for consumers to shop at, which in turn benefits parties who sell on it.

B. Transaction Platforms

239. Economists recognize a particular type of multi-sided platforms (often referred to as “transaction platforms”) that primarily facilitate observable transactions, often sales transactions, between the two groups of platform users. Transaction platforms exhibit particularly pronounced indirect network effects: the value of participation on a transaction platform increases not only with the number of users on the other side of the platform (sometimes referred to as membership externality), but also with the usage of the platform on the other side (sometimes referred to as usage externality). As a result, transaction platforms are typically able to charge one or both sides both an access fee for joining the platform and a usage fee for using it.⁴⁶²
240. Members of both sides must agree, more or less simultaneously, for a transaction to occur. For example, it is not sufficient that a customer holds a credit card and a merchant has a corresponding point-of-sale terminal, it must also be the case that both the customer and the

⁴⁵⁹ “Selling Policies and Seller Code of Conduct,” *Amazon Seller Central*, available at https://sellercentral.amazon.com/gp/help/external/G1801?language=en_US, accessed on February 2, 2021.

⁴⁶⁰ “Selling Policies and Seller Code of Conduct,” *Amazon Seller Central*, available at https://sellercentral.amazon.com/gp/help/external/G1801?language=en_US, accessed on February 2, 2021.

⁴⁶¹ “Selling Policies and Seller Code of Conduct,” *Amazon Seller Central*, available at https://sellercentral.amazon.com/gp/help/external/G1801?language=en_US, accessed on February 2, 2021.

⁴⁶² Filistrucchi, Lapo, Damien Geradin, Eric Van Damme, and Pauline Affeldt, “Market Definition in Two-Sided Markets: Theory and Practice,” *Journal of Competition Law & Economics*, 10(2), 2013, pp. 293-339. *See also*, Filistrucchi, Lapo, “A SSNIP Test for Two-Sided Markets: The Case of Media,” *NET Institute Working Paper*, October 2008, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1287442, at p. 10; Damme, E. van et al., “Mergers in Two-Sided Markets – A Report to the NMa,” *Netherlands Competition Authority*, 2010, pp. 1-183, at pp. 15, 27; Rochet, Jean-Charles, and Jean Tirole, “Two-Sided Markets: An Overview,” *Institut d’Economie Industrielle working paper*, 2004, at p. 3; Evans, David and Michael Noel, “Defining Antitrust Markets when Firms Operate Two-Sided Platforms,” *Columbia Business Law Review*, 2005, at p. 116; Pereira Neto, Caio Mario and Filippo Maria Lancieri, “Towards a Layered Approach to Relevant Markets in Multi-Sided Transaction Platforms,” *Antitrust Law Journal*, 83(2), 2021, at p. 10.

merchant must be willing to use the card for a particular transaction. The *Amex* Court recognized this distinction, noting that: “Because they cannot make a sale unless both sides of the platform simultaneously agree to use their services, two-sided transaction platforms exhibit more pronounced indirect network effects and interconnected pricing and demand.”⁴⁶³ The literature cited by the Court noted that transaction platforms provide a single product—transactions—that is jointly consumed by both sides of the platform, not separate products to each side of the platform.⁴⁶⁴ Payment cards and auction houses are familiar examples of transaction platforms discussed in the academic literature.⁴⁶⁵

241. Not all two-sided platforms are transaction platforms.⁴⁶⁶ Newspapers link advertisers and readers, but no transaction between them happens on the newspapers’ platforms. Facebook is another example of what are sometimes called “attention platforms” in the literature.⁴⁶⁷ Similarly, shopping malls facilitate interaction between shoppers and merchants but are not involved in any transactions between those two groups. As the Supreme Court noted in *Amex*, transaction platforms are characterized by particularly strong indirect network effects

⁴⁶³ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 13.

⁴⁶⁴ Klein, Benjamin, Andres V. Lerner, Kevin M. Murphy, and Lacey L. Plache, “Competition in Two-Sided Markets: The Antitrust Economics of Payment Card Interchange Fees,” *Antitrust Law Journal*, 73(3), 2006, pp. 571-626, at p. 580 (“a payment card system supplies only one product, payment card transactions that are jointly consumed by a cardholder, who uses the payment card to make a transaction, and a merchant, who accepts the payment card as a method of payment”); Filistrucchi, Lapo, Damien Geradin, Eric van Damme, and Pauline Affeldt, “Market Definition in Two-Sided Markets: Theory and Practice,” *Journal of Competition Law & Economics*, 10(2), 2013, pp. 293-339, at p. 298 (“Two-sided transaction markets, such as payment cards, are instead characterized by the presence and observability of a transaction between the two groups of platform users.”).

⁴⁶⁵ See, e.g., Filistrucchi, Lapo, Damien Geradin, Eric van Damme, and Pauline Affeldt, “Market Definition in Two-Sided Markets: Theory and Practice,” *Journal of Competition Law & Economics*, 10(2), 2013, pp. 293-339, at p. 293 (“Drawing from the economics of two-sided markets, we provide suggestions for the definition of the relevant market in cases involving two-sided platforms, such as media outlets, online intermediaries, payment cards companies, and auction houses.”).

⁴⁶⁶ Filistrucchi, Lapo, Damien Geradin, Eric van Damme, and Pauline Affeldt, “Market Definition in Two-Sided Markets: Theory and Practice,” *Journal of Competition Law & Economics*, 10(2), 2013, pp. 293-339, at p. 298 (“Two-sided non-transaction markets, such as most media markets, are characterized by the absence of a transaction between the two sides of the market and, even though an interaction is present, it is usually not observable, so that a per-transaction fee or per-interaction fee or a two-part tariff is not possible.”); Niels, Gunnar, “Transaction versus Non-Transaction Platform: A False Dichotomy in Two-Sided Market Definition,” *Journal of Competition Law and Economics*, 15(2-3), 2019, pp. 327-357.

⁴⁶⁷ See Evans, David S., “Attention Platforms, the Value of Content, and Public Policy,” *Review of Industrial Organization*, 54, 2019, pp. 775-792.

in both directions, since completion of a transaction necessarily involves the participation, often effectively simultaneously, of members of both groups involved.⁴⁶⁸

242. In the *Amex* case, the Court correctly applied the relevant economic learning by observing that “[t]ransaction platforms are thus better understood as ‘supply[ing] only one product’—transactions”—rather than separate products to each side of the platform.⁴⁶⁹ In my *amicus* brief in that matter, I reached the same conclusion for platforms that provide services that are “consumed jointly and unseverably” by members of two distinct groups—a slightly different way of describing transaction platforms.⁴⁷⁰ If a platform is in the business of providing transactions, as American Express (“Amex”) clearly is, it makes no economic sense to consider inputs into transactions production in isolation, as an exclusive focus on conduct with respect to only one of the groups involved (merchants in the *Amex* case) would do. This conclusion has important implications for assessing the alleged conduct in this matter, as I discuss in detail in **Section IV** above. Specifically, this conclusion means that because the basic underlying product here is transactions, identifying the boundaries of the relevant antitrust product market should therefore encompass both sides of the platform. Importantly, however, this conclusion should not be misinterpreted to mean that a relevant product market must encompass all transactions facilitated by a single transaction platform. On the contrary, a single transaction platform may face different competitive constraints for different types of transactions, just as a single producer of steel may sell the same product

⁴⁶⁸ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 13 (“For credit cards, the network can sell its services only if a merchant and cardholder both simultaneously choose to use the network. [...] Because they cannot make a sale unless both sides of the platform simultaneously agree to use their services, two-sided transaction platforms exhibit more pronounced indirect network effects and interconnected pricing and demand.”).

⁴⁶⁹ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at pp. 13-14 (“For all these reasons, ‘[i]n two-sided transaction markets, only one market should be defined.’”).

⁴⁷⁰ Brief for *Amici Curiae* Prof. David S. Evans and Prof. Richard Schmalensee in Support of Respondents, *State of Ohio et al. v. American Express Company et al.*, No. 16-1454, Supreme Court of the United States, January 23, 2018, at p. 5 (“The risk of error from ignoring customers on one side of a platform during the first stage of the rule of reason analysis is heightened for platforms that provide services that, by their very nature, are consumed jointly and unseverably by two different types of customers. In these cases, the platform can charge either or both types of customers for the service that both consume jointly in order to recover the platform’s costs and make a profit.”).

in several distinct markets. If those competitive constraints differ substantially, it will be appropriate to consider the different transactions types to be in separate relevant markets.

243. It is important to distinguish between the product supplied by a transaction platform to the two groups it serves, transactions, and what exchange the platform facilitates as a consequence between members of those groups. Payment cards like Amex facilitate purchases and sales of a wide variety of goods and services, but they do not supply or demand those goods or services. Their charges to merchants typically depend only on the dollar value of a transaction that they facilitate, not on the good or service involved in the transaction.
244. Transaction platforms generally compete with other transaction platforms to facilitate transactions between the same general groups. It is clear that general purpose payment cards compete with each other to facilitate transactions between merchants and consumers, for instance.
245. The products being bought and sold in a set of transactions need not be substitutes for the transactions themselves to be in the same market. In the *Amex* case, for instance, even though payment cards facilitate transactions involving a vast range of goods and services, the Supreme Court concluded that the relevant market was “the two-sided market for credit card transactions as a whole.”⁴⁷¹
246. When the competitive conditions for subsets of transactions differ appreciably, however, it is economically appropriate to analyze them separately. In the *Amex* litigation, for instance, plaintiffs argued unsuccessfully for a separate consideration of submarket for transactions involving travel and entertainment services, in which American Express had a higher share of transaction volume.⁴⁷² Had the market contained popular special-purpose cards usable

⁴⁷¹ Opinion, *Ohio et al. v. American Express Co. et al.*, No. 16-1454, Supreme Court of the United States, June 25, 2018, available at https://www.supremecourt.gov/opinions/17pdf/16-1454_5h26.pdf, at p. 15.

⁴⁷² Decision, *United States v. Am. Express Co.*, No. 10-CV-4496, United States District Court, Eastern District of New York., February 19, 2015, available at https://www.govinfo.gov/content/pkg/USCOURTS-nyed-1_10-cv-04496/pdf/USCOURTS-nyed-1_10-cv-04496-4.pdf, at pp. 61-62 (“Within the boundaries of the broader network services market, Plaintiffs additionally propose that the court recognize a submarket consisting of GPCC card network services provided to T&E merchants. [...] Here, however, Plaintiffs have failed to establish that a hypothetical monopolist’s ability to charge a higher price in T&E industries constitutes price discrimination such that it would be appropriate to define a submarket around these ‘targeted customers.’”).

for hotel transactions only, such as the charge cards issued by Hilton Hotels in the 1950s,⁴⁷³ this argument might well have been successful.

247. An art gallery that displays and manages the sale of paintings owned by others is an instructive example of a transaction platform. It is a platform because it exists to facilitate interactions between artists and art buyers by choice of venue, curation, and other means. It is a transaction platform because its business is to sell paintings. It is properly analyzed as producing a single product: sales of paintings.
248. As a two-sided platform, a gallery creates value through the indirect network effects that it offers to artists and art buyers in competition with other galleries and, perhaps, other channels through which artists and art buyers can interact.⁴⁷⁴ Both artists and art buyers benefit from the platform that the gallery offers for members of the two groups to interact. In addition to facilitating the sale of artwork, galleries—as transaction platforms—typically also offer a variety of services to artists and collectors on an ongoing basis. These services ultimately benefit all parties as they can lead to potential transactions in the future. Such services include, for example, “maintaining visual material for promotional purposes, [...] cultivating collectors and corporate clients, [...] monitoring the practitioner’s interests and legal rights, [...] collaborating with the practitioner on competition, grant and commission submissions.”⁴⁷⁵
249. To capture some of this value, galleries typically choose to monetize by retaining between 30 percent and 60 percent of the artwork’s sales price.⁴⁷⁶ This commission is much higher

⁴⁷³ Evans, David S. and Richard Schmalensee, *Paying with Plastic*, Second Edition, MIT Press, December 17, 2005, at p. 59.

⁴⁷⁴ Some artists have websites that enable them to sell directly to art buyers. See, e.g., “Daryl V Storrs,” *Daryl V Storrs*, available at <https://www.darylstorrs.com/>, accessed on February 2, 2021.

⁴⁷⁵ “Code of Practice: Commercial Galleries and Retail Outlets,” *National Association for the Visual Arts*, available at <https://visualarts.net.au/code-of-practice/11-commercial-galleries/>, accessed on September 7, 2020.

⁴⁷⁶ “What Commission Rate Do Galleries Typically Retain When They Handle Artists’ Work?” *Fine Art Trade Guild*, available at <https://www.fineart.co.uk/faq/commission-rates-to-artists-32.aspx>, accessed on September 5, 2020 (“Galleries typically retain between 30% and 60% of the selling price.”); “Gallery-Artist Agreement,” *Copyrights, Contracts, & Guidelines for Dinosaur Artists & Paleontologists*, available at <http://www.dinoart.com/publications/prt2pg11.html>, accessed on September 5, 2020 (“Standard commission percentages range from 32%, (where the artist takes care of many of the show expenses,) to 50%, (where the gallery absorbs all costs except framing.)”); Martin, Jenna, “Selling Art in Galleries: Everything You Need To

than the payment processing fees that the gallery pays, for instance, when a purchase is made via credit card, as it compensates the gallery for all its services to artists and art buyers.

250. There are many alternative monetization strategies a gallery could implement instead. For example, the gallery could choose to charge art buyers a fee to enter the gallery (*i.e.*, an access fee). However, this monetization strategy could be counterproductive, as it might reduce the number of art buyers, which in turn would likely reduce the value of the gallery to artists. Charging a percentage commission per transaction, on the other hand, is much more in line with economic fundamentals, as monetization is proportional to the value of the transaction to the buyer, *i.e.*, the higher the sales price, the higher the commission the gallery receives.

C. The App Store Business Model

251. The iOS business is a platform linking app developers and consumers: more quality apps make iOS devices more powerful and thus attract consumers, and more consumers using iOS devices constitute a larger market that attracts app developers to the iOS ecosystem. The App Store enhances these indirect network effects by directly facilitating transactions between consumers and developers.
252. As will be discussed further below, app distribution and the iOS App Store are relatively new and continuously evolving, making it particularly inappropriate to conclude that Apple’s conduct is anticompetitive without having demonstrated so through a rigorous analysis. In technology markets with such dynamic changes and rapid innovation it is especially important to understand the at-issue business practices deeply, paying particular attention to the potentially large consumer benefits that flow from innovation. In such markets erroneously judging novel business practices as anti-competitive can have long lasting effects on economic growth and social welfare.⁴⁷⁷ This was recognized by the Ninth

Know,” *PetaPixel*, November 14, 2014, available at <https://petapixel.com/2014/11/14/selling-art-galleries-everything-need-know/> (“Every gallery is different, but most galleries take somewhere around a 50% commission from pieces you sell. Some take 40%, but rarely do any take more than 50%.”).

⁴⁷⁷ Rachel S. Tennis & Alexander Baier Schwab, Business Model Innovation and Antitrust Law, 29 Yale J. on Reg., 29, 2012, pp. 307-351, at p. 319 (“antitrust economists, and in turn lawyers and judges, tend to treat novel products or business practices as anticompetitive” and “are likely to decide cases wrongly in rapidly

Circuit in *FTC v. Qualcomm*, where the Court declined to ascribe antitrust liability in the dynamic and rapidly changing technology market for microchips without clearer proof of anticompetitive effect, drawing parallels to *Amex*, where “a company’s novel business practice at first appeared to be anticompetitive, but in fact was disruptive in a manner that was beneficial to consumers in the long run because it forced rival credit card companies to adapt and innovate.”⁴⁷⁸

1. History of App Distribution

253. In the early years of the PC era, app developers would contract with publishing houses to offer their personal computer software in brick-and-mortar stores, and consumers would travel to those stores to purchase software.⁴⁷⁹ Developers would agree to pay publishers a share of sales or up-front cash to finance the packaging, advertising, and marketing of software, and this share could be extremely high.⁴⁸⁰ Developers could also distribute their

changing dynamic markets,” which can have long-lasting effects particularly in technological markets, where innovation “is essential to economic growth and social welfare” and “an erroneous decision will deny large consumer benefits”)

⁴⁷⁸ Opinion, *Federal Trade Commission v. Qualcomm Incorporated*, No. 19-16122, United States Court of Appeals for the Ninth Circuit, August 11, 2020, available at <https://cdn.ca9.uscourts.gov/datastore/opinions/2020/08/11/19-16122.pdf>, at p. 51.

⁴⁷⁹ “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on February 26, 2021, at p. 1 (“In the early 1990s, consumers were tasked with the challenge of locating and then traveling to a brick-and-mortar store that happened to sell software.”); Statement of Tim Cook, Apple Inc., *House Judiciary Subcommittee Hearing*, July 29, 2020, available at <https://docs.house.gov/meetings/JU/JU05/20200729/110883/HHRG-116-JU05-Wstate-CookT-20200729.pdf>, at p. 2 (“When the App Store was created, the prevailing distribution options available to software developers at the time did not work well. Brick-and-mortar stores charged high fees and had limited reach. Physical media like CDs had to be shipped and were hard to update.”); Sweeney Deposition, at 17:24-18:17 (“Q. And you mentioned that it was difficult [...] to get your products into retail -- to retail, physical retail stores. Why is that? A. At the time there were numerous retailers that sold video games all around the world. They had complicated buying processes which required negotiating with various groups, and these were not generally accessible or known to 19 or 20-year-old kids. And generally it was seen at the time that any independent developer like myself, in order to successfully distribute in retail, would need to work with a publisher, a company like Electronic Arts or Activision who had those retail relationships and could also oversee the other physical challenges of retail distribution such as manufacturing, professional quality, disks and packaging materials.”).

⁴⁸⁰ See, e.g., “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on September 14, 2020, at p. 2 (“Bungie—developer of popular games Halo, Myth, Oni, and Marathon—chronicled in 1996 the difficult and sometimes oppressive distributor requirements placed on software developers that predated the platform ecosystem. When dealing with retail distributors, Bungie was required to guarantee a competitive price, pay 3-6 percent of sales as a marketing fee

apps directly to consumers by distributing floppy disks or CD-ROMs containing their software, which is what AOL did in the 1990s.⁴⁸¹ Other developers made their software available for download on the internet. Netscape, an internet browser that ran on Windows and MacOS, was available from ftp.netscape.com as early as 1994 and was downloaded approximately 10 million times by 1996.⁴⁸² Similarly the client app for napster, a file-sharing service focused on digital music, was available for download early as 1999.⁴⁸³ At its peak, napster had around 80 million active users before being shut down by court order in 2001.⁴⁸⁴

254. The App Store and other online transaction platforms have made it much easier for potential customers to find and acquire attractive apps and for app developers to reach potential customers. Before online distribution, interactions between developers and customers involved large frictions related to search and asymmetric information, as well as costs of transportation, storage, and display. Even after the rise of faster internet connections in the 2000s, developers incurred significant costs in managing their public websites, handling financial transactions, protecting their intellectual property, and

in addition to \$10,000 for product launch marketing, pay shipping to deliver their products to distributors, and agree to buy back unsold products. Once contracts were negotiated, software developers were often required to spend additional money so that in-store catalogs would feature their product or retail stores would place their product on an end cap display, all before consumers even saw the products.”). *See also* Deposition of C.K. Haun, Vol.1, January 13 (“Haun Deposition, Vol.1”), 2021, 68:15-22 (“I will share my own personal experiences in the third-party software community prior to my arrival at Apple. And when I worked with a software distributor to distribute a product of mine, the third-party distributor in cases that I specifically was involved with took 80 to 93% of the retail price and delivered to me 7 to 20% of that revenue.”).

⁴⁸¹ Siegler, MG, “How Much Did It Cost AOL To Send Us Those CDs In The 90s? ‘A Lot!’ Says Steve Case,” *TechCrunch*, December 27, 2010, available at <https://techcrunch.com/2010/12/27/aol-discs-90s/>.

⁴⁸² “Netscape Communications Offers Net Network Navigator Free on the Internet,” *Netscape Communications*, October 13, 1994, available at <https://web.archive.org/web/20061207145832/http://wp.netscape.com/newsref/pr/newsrelease1.html>; Sebenius, James K., “Negotiating Lessons From the Browser Wars,” *MIT Sloan Management Review*, July 15, 2002, available at <https://sloanreview.mit.edu/article/negotiating-lessons-from-the-browser-wars/>.

⁴⁸³ “napster,” *napster*, archived on October 8, 1999, available at <https://web.archive.org/web/19991008215720/http://napster.com/>.

⁴⁸⁴ Gowan, M., “Requiem for Napster,” *PC World*, 18 May, 2002, available at https://www.pcworld.idg.com.au/article/22380/requiem_napster/; King, Brad, “The Day the Napster Died,” *WIRED*, May 15, 2002, available at <https://www.wired.com/2002/05/the-day-the-napster-died/>.

promoting and securing consumer trust.⁴⁸⁵ Importantly, consumer trust typically requires a substantial online reputation, which can be difficult for new developers to acquire by themselves.⁴⁸⁶

255. Platforms for the online distribution of apps began to appear in the 1990s.⁴⁸⁷ In that decade, Palm, a personal digital assistant device, offered several third-party applications.⁴⁸⁸ The Handango platform, launched in 1999, could be accessed from PCs or Macs. It gave developers a 60 percent share of online sales and kept 40 percent.⁴⁸⁹ A similar division of revenues has become nearly universal since. Nokia’s Ovi Store and Blackberry’s Blackberry World had commission rates between 30 and 40 percent while they were active,

⁴⁸⁵ “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on September 14, 2020, at p. 1 (“App companies were not only required to write code for their products, but they were also responsible for: (1) managing their public websites, (2) hiring third-parties to handle financial transactions, (3) employing legal teams to protect their intellectual property, and (4) contracting with distributors to promote and secure consumer trust in their product.”).

⁴⁸⁶ “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on September 14, 2020, at p. 1 (“In the internet economy, immediate consumer trust is almost impossible without a substantial online reputation and not attaining it spells death for any app company. [...] In this context, trust refers to an established relationship between the app company and consumer where the consumer demonstrates confidence to install the app and disclose otherwise personal information to an app company.”); “Online Platforms and Market Power, Part 2: Innovation and Entrepreneurship,” Testimony of Morgan Reed Before the U.S. House of Representatives Judiciary Committee, Subcommittee on Antitrust, Commercial and Administrative Law, July 16, 2019, at p. 5 (“[T]rust refers to an established relationship between the app company and consumer where the consumer has the confidence to install the app and disclose otherwise personal information to an app company. Prior to platforms, software developers often handed over their products to companies with a significant reputation to break through the trust barrier.”).

⁴⁸⁷ Edwards, Benj, “Before Mac OS X: What Was NeXTSTEP, and Why Did People Love It?” *How-To Geek*, November 7, 2020, available at <https://www.howtogeek.com/698532/before-mac-os-x-what-was-nextstep-and-why-did-people-love-it/> (“One of the first attempts at a digital ‘App Store’ for computer applications debuted on NeXTSTEP in 1991: The Electronic AppWrapper sold commercial packages as digital network downloads managed by encryption and digital rights management.”).

⁴⁸⁸ Yoffie, David B. and Renee Kim, “Apple Inc. in 2010,” *Harvard Business School*, July 7, 2014, at p. 11.

⁴⁸⁹ “Handango CEO Is Dialed In,” *D Magazine*, March 2007, available at <https://www.dmagazine.com/publications/d-ceo/2007/march/handango-ceo-is-dialed-in> (“Handango’s success in the smartphone market required setting anchor in 1999”); “Developer Information,” *Handango*, December 12, 2005, available at https://web.archive.org/web/20051212113802/http://developer.handango.com/DeveloperInformation.jsp?siteId=1&CKey=DEV_FAQ (“[W]e retain 40% of the revenues (excluding taxes) for products sold through the main Handango Web site at www.handango.com.”).

and many currently-active mobile app stores also charge commissions of around 30 percent.⁴⁹⁰

256. In 2020, a review of commission rates in digital marketplaces reported that commissions of 30 percent or higher are common in digital content platforms, even in competitive environments.⁴⁹¹ E-book platforms such as Kindle, Nook, and Kobo, typically charge between 30 and 35 percent for the distribution of self-published books.⁴⁹² Amazon’s audiobook platform Audible charges a commission rate of 60 to 75 percent while Kobo charges 55 to 68 percent.⁴⁹³ Amazon Prime Video Direct charges a 50 percent commission rate on purchase and rental revenue, and game livestreaming platform Twitch charges a 50 percent on subscription revenue.⁴⁹⁴ A 30 percent commission is also standard in the games industry—PlayStation Store, Xbox Games Store, Nintendo eShop, Steam, and Microsoft

⁴⁹⁰ Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 22, 2020, available at https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf, at A-1-A-4.

⁴⁹¹ Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 22, 2020, available at https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf, at p. 2, Table 1; *see also* id., at p. 6 (“In China, in the absence of Google Play, dozens of competing Android app stores have sprung up [...] [t]he commission rate charged by these app stores is often 50% or more.”).

⁴⁹² Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 22, 2020, available at https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf, at p. 7.

⁴⁹³ Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 22, 2020, available at https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf, at p. 7.

⁴⁹⁴ Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 22, 2020, available at https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf, at p. 7.

Store, are just a few of the many game stores that take this percentage.^{495,496} Interestingly, many of these platform companies charging 30 percent commissions, including Microsoft, Amazon, Nintendo, and Sony, are also members of the developers’ putative class in this matter.⁴⁹⁷

257. It is important to note that these 30 percent commissions are considerably lower than what was charged to developers for distribution in brick-and-mortar retail. In fact, the norm for third-party developers in the early 2000s was to *receive* no more than 30 percent of sales revenue.⁴⁹⁸ As Epic CEO Tim Sweeney testified, “my understanding of the industry before

⁴⁹⁵ Marks, Tom, “Report: Steam’s 30% Cut Is Actually the Industry Standard,” *IGN*, January 13, 2020, available at <https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard>. Until August 1, 2021, Microsoft charged a 30% commission on PC games which was then dropped to 12%; *see* Conditt, Jess, “Microsoft follows Epic and cuts Xbox PC revenue share to 12 percent,” *Engadget*, April 29, 2021, available at <https://www.engadget.com/xbox-pc-rev-share-88-12-epic-apple-130036485.html>. *See also* Deposition of Steven Allison, Vol.1, February 9, 2021 (“Allison Deposition, Vol.1”), at 54:23-55:6 (“Q. All right. And we’ve discussed how the industry revenue split was 70/30 at the time. How prevalent was that standard? A. It’s -- look, I would say -- again, winding back to the answer I just gave you, it was the standard on just about every platform that wasn’t PC. As they launched their stores in the years, you know, from 20 -- you know, 2005 to 2009, so console and mobile stores.”).

⁴⁹⁶ In fact, the cost of distributing video games has been far higher historically. In the late 1980s and early 1990s, Nintendo, which dominated the console market, required game developers to use its cartridges if they wanted to develop games for its consoles. Developers were charged a 20 percent royalty as well as a manufacturing fee of \$14 per cartridge (even though the manufacturing cost was \$7 per cartridge), with a minimum order of 50,000 cartridges. Even as recently as the 2000s, game developers had to contract with game publishing companies to sell their products to console manufacturers, and were only paid an amount ranging from 5 to 40 percent (depending on the publishers’ revenues) of each game sold. *See* Grant, Robert, “Rivalry in Video Games,” in *Contemporary Strategy Analysis*, 6th edition, Blackwell Publishing, 2008, pp. 185-201, at pp. 187-188, 195; Greco, John, “Microsoft’s Xbox Gamble,” *Glassmeyer/McNamee Center for Digital Strategies, Tuck School of Business at Dartmouth*, March 2002, at p. 7.

⁴⁹⁷ Amazon is in the Video Partner Program, while Microsoft, Nintendo, and Sony offer apps in which consumers have made in-app purchases in the App Store. For example, Microsoft has *Minecraft*, Nintendo has *Mario Kart Tour*, and Sony has *Zombieland: AFK Survival*. *See* “*Minecraft* on the App Store,” *Apple*, available at <https://apps.apple.com/us/app/minecraft/id479516143>, accessed on July 29, 2021; “*Mario Kart Tour* on the App Store,” *Apple*, available at <https://apps.apple.com/us/app/mario-kart-tour/id1293634699>, accessed on July 29, 2021; “*Zombieland: AFK Survival* on the App Store,” *Apple*, available at <https://apps.apple.com/us/app/zombieland-afk-survival/id1457597952>, accessed on July 23, 2021; “Apple Video Partner Program,” *Apple*, available at <https://developer.apple.com/programs/video-partner/>, accessed on July 30, 2021 (“As of fall 2020, over 130 premium subscription video entertainment providers around the world have signed on to participate in this program, such as Amazon Prime Video [...]).”).

⁴⁹⁸ Sweeney Deposition, at 22:11-22:21 and 24:17-24:24 (“[T]he typical publisher royalties we were aware of from third-party publishers were generally in the 15 to 30 percent range with industry lore that there were higher rates available for sufficient prominent product. Q. And, again, just to make sure I’m understanding who’s getting what, when you say the royalties were 15 to 30 percent, that was the percentage that the publishers would pay to the developers? A. Yes. [...] Q. So [...] up until 2008 or so, publishers’ commissions may have increased to 20 or 30 percent as a typical royalty paid to game developers; is that

[the] Apple App Store was that carriers would negotiate deals with game developers on terms that were generally much inferior to the revenue-sharing model that Steam had introduced earlier and then Apple had introduced around 2008.”⁴⁹⁹ Even today, Epic pays retail publisher Gearbox a [REDACTED] for brick-and-mortar distribution.⁵⁰⁰

258. The first successful online platform focused on game distribution appears to have been Steam, launched in 2003.⁵⁰¹ Initially, Steam only facilitated distribution of games developed by Valve for Windows PCs, but beginning in 2005 it began to facilitate distribution of games developed by other firms, and in 2010 it began to distribute games for macOS devices.⁵⁰² Online stores for the Microsoft Xbox, Nintendo Switch, and Sony PlayStation now allow consumers to buy games for those platforms. Xbox Live Marketplace for Xbox was launched in 2005, PlayStation Store for PlayStation was

correct? [...] [A.] My understanding is that that was a typical publisher royalty rate in the 2006 time frame.”).

⁴⁹⁹ Sweeney Deposition, at 26:5-8 (“Q. And by ‘much inferior,’ do you mean that they paid the developers much less than the Steam and Apple models that were developed? A. Yes.”).

⁵⁰⁰ See EPIC_03848271. Gearbox is a retail publisher; see “Gearbox Publishing Teams with Epic Games to Bring Fortnite’s Storm to Stores,” *Gearbox Software*, June 2017, available at <https://www.gearboxsoftware.com/2017/06/gearbox-publishing-teams-with-epic-games-to-bring-fornites-storm-to-stores/>. See also Deposition of Joe Kreiner, Vol.1, February 5, 2021 (“Kreiner Deposition, Vol.1”), at 114:2-14 (“Q. Okay. And did -- did you partner with somebody to do the actual physical distribution? A. Yes. We partnered with multiple companies to do physical distribution [...] It would have been Gearbox for physical Fortnite, and Warner Bros. for the more recent physical offerings that are code in a box. Q. Got it. And we’ll break those apart. So Gearbox was the only company that actually distributed the game on disk for you? A. That’s correct.”); *Id.*, at 115:17-116:11 (“[F]or a physical disk, the first party [...] requires those to be created at one of their locations. And they typically take a fixed per-disk fee that -- that is charged and collects, at which then gearbox [sic] pays that fee in -- in this particular case in -- on behalf of Epic and passes the cost through to us. And then Gearbox arranges with the -- the retailers to purchase the disks at a wholesale price. The retailers mark it up and make a profit off of that [...] [H]ow does Epic get compensated for a physical product? A. It would be the wholesale price minus the platform fee minus the Gearbox fee.”); *Id.*, at 141:14-22 (“Focusing on the [REDACTED] Gearbox, is Gearbox the entity that you identified as the company that used to distribute your -- that used to distribute Fortnite via disk? A. That’s correct. Q. And -- and Gearbox is not the company that’s distributing the -- I think you called it code in a box. They just did the disks, right? A. Correct.”).

⁵⁰¹ Sayer, Matt and Tyler Wilde, “The 15-year Evolution of Steam,” *PC Gamer*, September 12, 2018, available at <https://www.pcgamer.com/steam-versions>.

⁵⁰² Sayer, Matt and Tyler Wilde, “The 15-year Evolution of Steam,” *PC Gamer*, September 12, 2018, available at <https://www.pcgamer.com/steam-versions>.

launched in 2006, and Nintendo eShop, which became the Switch’s online store when the Switch launched in 2017, was launched in 2011 initially for 3DS.⁵⁰³

259. The first successful on-device platform for mobile devices seems to have been Handango Inhand, which launched in 2003 for devices using the Symbian operating system.⁵⁰⁴ Over the next two years, it expanded coverage to devices using the Windows Mobile, Palm OS, and Blackberry operating systems.⁵⁰⁵ Other platforms that facilitate transactions between app developers and consumers have emerged since the launch of the App Store. Android Market was announced in 2008 and was later merged into Google Play in 2012.⁵⁰⁶ It soon became a close competitor to the App Store, attracting the interest of 81 percent of developers in 2010 (compared to 87 percent for the App Store).⁵⁰⁷ Nokia’s Ovi Store and Samsung Galaxy Apps were introduced in 2009, and the Amazon App Store launched in 2011.⁵⁰⁸ **Exhibit 1** lists digital distribution platforms with their year of introduction.

⁵⁰³ “Microsoft Unveils Xbox Live Marketplace Content Available at Launch of Xbox 360,” *Game Industry*, November 15, 2005, available at <https://www.gamesindustry.biz/articles/microsoft-unveils-xbox-live-marketplace-content-available-at-launch-of-xbox-360>; “PlayStation®3 Launches Next Generation of Entertainment in North America,” *Sony Computer Entertainment America*, November 17, 2006, available at https://www.sony.com/content/sony/en/en_us/SCA/company-news/press-releases/sony-computer-entertainment-america-inc/2006/playstation3-launches-next-generation-of-entertainment-in-north-america.html; Tsukayama, Hayley, “Nintendo eShop to Launch June 6,” *The Washington Post*, May 12, 2011, available at https://www.washingtonpost.com/blogs/faster-forward/post/nintendo-eshop-to-launch-june-6/2011/05/12/AFcwWM1G_blog.html; Reisinger, Don, “Here’s How the Nintendo Switch eShop Will Work,” *Tom’s Guide*, February 23, 2017, available at <https://www.tomsguide.com/us/nintendo-switch-eshop,news-24528.html>.

⁵⁰⁴ Hardy, Ed, “Install Software Directly to a Smart Phone with InHand,” *Brighthand*, February 26, 2004, available at <http://www.brighthand.com/news/install-software-directly-to-a-smart-phone-with-inhand/?site=SmartPhone> (“Handango released a version of InHand for Symbian devices running the UIQ interface last fall.”).

⁵⁰⁵ Hardy, Ed, “Handango Releases Industry’s First Download Client for BlackBerry,” *Brighthand*, February 18, 2005, available at <http://www.brighthand.com/news/handango-releases-industrys-first-download-client-for-blackberry> (“Handango InHand for BlackBerry joins the Handango InHand family of download clients for smart phones and wireless handhelds utilizing Symbian OS UIQ, Palm OS and Windows Mobile [...]”).

⁵⁰⁶ Callaham, John, “From Android Market to Google Play: a Brief History of the Play Store,” *Android Authority*, March 6, 2017, available at <https://www.androidauthority.com/android-market-google-play-history-754989/>.

⁵⁰⁷ Yoffie, David B. and Renee Kim, “Apple Inc. in 2010,” *Harvard Business School*, July 7, 2014, at p. 12.

⁵⁰⁸ Cowley, Stacey, “Amazon Prepares to Launch Android Appstore,” *CNN Money*, January 5, 2011, available at https://money.cnn.com/2011/01/05/technology/amazon_appstore/index.htm; Woyke, Elizabeth, “Nokia’s Gigantic App Store,” *Forbes*, May 7, 2009, available at <https://www.forbes.com/2009/05/07/nokia-ovi-store-technology-wireless-nokia.html?sh=77c982bc513a>; Ganapati, Priya, “Samsung Joins the App Store Party,” *WIRED*, August 31, 2009, available at <https://www.wired.com/2009/08/samsung-app-store/>.

260. Platforms specializing in the digital distribution of books, music, and news also emerged in the 2000s. The first e-ink e-book reader, Sony LIBRIe, launched in 2004, and Kindle and Nook followed in 2007 and 2009 respectively.⁵⁰⁹ Last.fm, a music-streaming platform, launched in 2002, while Pandora launched in 2005 and Spotify launched in 2008.⁵¹⁰ In addition, newspapers that were traditionally only available in print began building their online presence. *The New York Times* began publishing articles online in 1996 and unveiled Times Reader, an electronic version of the paper, for Windows computers in 2006.⁵¹¹

2. History of iOS and the App Store

261. The first iOS device, the iPhone, was launched in June 2007.⁵¹² It was a new entrant in a marketplace with several established competitors, including Samsung, Nokia, LG, Sony Ericsson, Rim (Blackberry), Motorola, Windows Mobile, and Palm.⁵¹³ Initially, the iPhone

⁵⁰⁹ Pilato, Fabrizio, “Sony LIBRIe – The first ever E-Ink e-Book Reader,” *Mobile Magazine*, March 25, 2004, available at <https://web.archive.org/web/20130514132046/http://www.mobilemag.com/2004/03/25/sony-librie-the-first-ever-e-ink-e-book-reader/>; “A look back at 10 years of the Amazon Kindle,” *Amazon*, November 21, 2017, available at <https://www.aboutamazon.com/news/devices/a-look-back-at-10-years-of-the-amazon-kindle>; Rich, Motoko, “A New Electronic Reader, the Nook, Enters the Market,” *The New York Times*, October 20, 2009, available at <https://www.nytimes.com/2009/10/21/technology/21nook.html>.

⁵¹⁰ Betts, Andy, “Remember Last.fm? A Fresh Look at the Redesigned Music Service,” *MUO*, June 8, 2015, available at <https://www.makeuseof.com/tag/remember-last-fm-look-redesigned-music-service/>; Westhoff, Marius, “Pandora Media - from winner to loser - and back?” *Harvard Business School*, February 11, 2020, available at <https://digital.hbs.edu/platform-digit/submission/pandora-media-from-winner-to-loser-and-back>; “How Spotify came to be worth billions” *BBC*, March 1, 2018, available at <https://www.bbc.com/news/newsbeat-43240886>.

⁵¹¹ Lichterman, Joseph, “20 years ago today, NYTimes.com debuted ‘on-line’ on the web,” *Neiman Foundation*, January 22, 2016, available at <https://www.niemanlab.org/2016/01/20-years-ago-today-nytimes-com-debuted-on-line-on-the-web>; Larson, Rob, “Introducing Times Reader,” *The New York Times*, August 21, 2006, available at <https://web.archive.org/web/20120118112607/https://firstlook.blogs.nytimes.com/2006/08/21/about-times-reader/>.

⁵¹² “Apple Reinvents the Phone with iPhone,” *Apple*, January 9, 2007, available at <https://www.apple.com/newsroom/2007/01/09Apple-Reinvents-the-Phone-with-iPhone/> (“iPhone will be available in the US in June 2007”).

⁵¹³ Lancaster, Luke and Kent German, “Going head-to-head with the iPhone in 2007,” *CNET*, June 29, 2016, available at <https://www.cnet.com/pictures/going-head-to-head-with-the-iphone-in-2007/>; APL-APPSTORE_10337850-975, at 917-918.

did not allow any third-party native apps on the iPhone.^{514,515} At this stage, Apple was thus operating an ordinary single-sided business in the mobile space.⁵¹⁶ With its “remarkably elegant, easy to use, and even fun to play with [hardware and software],”⁵¹⁷ Apple could perhaps have successfully held on to this model for the iPhone, only allowing independent app developers access to iPhone users via web-based apps. By the fourth quarter of 2007 the iPhone’s share of the smartphone business had risen to 6.5 percent, well behind Nokia’s 52.9 percent and Rim’s 11.4 percent.⁵¹⁸

262. In October 2007, Steve Jobs announced that Apple would make available a Software Development Kit (SDK) that would allow developers to write native applications for iOS devices, which was later released in March 2008.⁵¹⁹ Jobs also announced the App Store, through which third-party developers could connect with consumers and deliver native apps

⁵¹⁴ Silver, Stephen, “The revolution Steve Jobs resisted: Apple’s App Store marks 10 years of third-party innovation,” *Apple Insider*, July 10, 2018, available at <https://appleinsider.com/articles/18/07/10/the-revolution-steve-jobs-resisted-apples-app-store-marks-10-years-of-third-party-innovation> (“When the first-generation iPhone arrived in 2007, it came with apps, but all of them were made by Apple. It had Mail, Safari, iTunes, Photos, Messages, Visual Voicemail, weather, camera, the calendar, the clock, and a few others that were Apple’s own, without any non-Apple apps, or user choice for alternative versions.”). *See also* Albergotti, Reed, “How Apple uses its App Store to copy the best ideas,” *The Washington Post*, September 5, 2019, available at <https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas/> (“At first, the only software allowed to be installed on an iPhone was Apple’s. A year after the phone launched in 2007, Apple opened up to allow third parties to build new programs for the phone.”).

⁵¹⁵ Apple also did not initially allow users to delete its own pre-loaded apps, a policy that it later reversed. *See* Moscaritolo, Angela, “How to Ditch Pre-Installed iPhone Apps With iOS 10 Beta,” *PCMag*, June 15, 2016, available at <https://www.pcmag.com/news/how-to-ditch-pre-installed-iphone-apps-with-ios-10-beta>. It also recently allowed users to set third-party apps as the default for the first time. *See* “iOS 14,” *Apple*, available at <https://www.apple.com/ios/ios-14/>, accessed on February 6, 2021 (“With iOS 14, you can set a third-party app as the default email or browser app systemwide.”); *and* Muchmore, Michael, “How to Change Your Default Browser and Mail Apps in iOS 14,” *PCMag*, October 7, 2020, available at <https://www.pcmag.com/how-to/how-to-change-your-default-browser-and-mail-apps-in-ios-14>.

⁵¹⁶ Pierce, David and Lauren Goode, “The WIRED Guide to the iPhone,” *WIRED*, December 7, 2018, available at <https://www.wired.com/story/guide-iphone/>.

⁵¹⁷ Tweney, Dylan, “Review: Apple iPhone Rocks, Rolls, and Doesn’t Disappoint,” *WIRED*, July 1, 2007, available at <https://www.wired.com/2007/07/review-apple-ip/>.

⁵¹⁸ Kim, Ryan, “Apple No. 2 in smartphone sales in US, No. 3 worldwide,” *SFGate*, The Technology Chronicles, February 7, 2008, available at <https://blog.sfgate.com/techchron/2008/02/07/apple-no-2-in-smartphone-sales-in-us-no-3-worldwide/>.

⁵¹⁹ APL-APPSTORE_00000055-087, at 062. (“Starting today we are opening up the same native APIs and tools that we use internally to build all our iPhone applications. This means that third party developers can build native iPhone applications using the same SDK that we do.”).

to them that had been reviewed and approved by Apple.⁵²⁰ As **Exhibit 1** indicates, when the App Store launched in July 2008, there were already online app stores for the major game consoles (Xbox, PlayStation, and Nintendo Wii). There were also several on-device platforms for distributing mobile apps (Handango Inhand, GetJar, and The Nokia Store), as well as several stores, including the game distribution platform Steam, from which PC applications could be downloaded.⁵²¹ While the App Store was not the first platform to distribute third-party apps, a Harvard Business School case study described it as the “first outlet that made it easy to distribute, access, and download applications directly onto the mobile phone.”⁵²²

263. The App Store launched on July 10, 2008, with around 500 apps.⁵²³ Only 30 days later, the App Store already offered more than 1,500 apps, and 60 million apps had been downloaded.⁵²⁴ A year and a half after its launch, the App Store had 185,000 apps in a wide range of categories from games to health to business productivity, and four billion apps had been downloaded.⁵²⁵ Through the App Store, developers could offer apps at a price of their choice, including at no charge.⁵²⁶ Apple also offered software developer kits

⁵²⁰ “10 Years Ago, the App Store Still Didn’t Understand What it Meant to be Mobile,” *The Verge*, July 10, 2018, available at <https://www.theverge.com/2018/7/10/17550430/apple-iphone-ios-app-store-10-years-look-back>.

⁵²¹ See **Exhibit 1**.

⁵²² Yoffie, David B. and Renee Kim, “Apple Inc. in 2010,” *Harvard Business School*, July 7, 2014, at p. 11.

⁵²³ “10 Years Ago, the App Store Still Didn’t Understand What it Meant to be Mobile,” *The Verge*, July 10, 2018, available at <https://www.theverge.com/2018/7/10/17550430/apple-iphone-ios-app-store-10-years-look-back>. Tech reviewers have considered the launch of the App Store one of the most significant events in the evolution of the iPhone. See, e.g., Pierce, David and Lauren Goode, “The WIRED Guide to the iPhone,” *WIRED*, December 7, 2018, available at <https://www.wired.com/story/guide-iphone/> (“The App Store will almost certainly stand as Apple’s most important contribution to both the tech industry and society in general, even more than the phone itself. Developers immediately began building apps and games that changed the way we communicate, work, eat, and play. The App Store made way for Instagram, Uber, and Tinder, and it turned the iPhone into the pocket computer it was always meant to be.”).

⁵²⁴ “‘The Mobile Industry’s Never Seen Anything Like This’: An Interview With Steve Jobs at the App Store’s Launch,” *The Wall Street Journal*, July 25, 2018 reprint of an interview from August 7, 2008, available at <https://www.wsj.com/articles/the-mobile-industrys-never-seen-anything-like-this-an-interview-with-steve-jobs-at-the-app-stores-launch-1532527201>.

⁵²⁵ Yoffie, David B. and Renee Kim, “Apple Inc. in 2010,” *Harvard Business School*, July 7, 2014, at p. 11.

⁵²⁶ APL-APPSTORE_00000055-087, at 075.

for free, to assist developers in developing their apps.⁵²⁷ To distribute their apps through the App Store, developers were required to join Apple’s Developer Program, which required a nominal annual fee of \$99.⁵²⁸ Using the tools included in the SDK, developers were able to create apps in less than two weeks.⁵²⁹

264. With the launch of the App Store, Apple’s iOS devices became a multi-sided software platform connecting developers and users,⁵³⁰ with the App Store facilitating those connections, like the platforms operated by the major game console producers and others. However, even with its decision to open the iPhone to developers, Apple maintained what it describes as its “ongoing focus on the deep integration of hardware, software and services.”⁵³¹ The bulk of Apple’s revenues still comes from devices.⁵³²
265. The purpose of the App Store was simple—to create “a safe and trusted place for customers to discover and download apps, and a great business opportunity for all developers.”⁵³³ As Steve Jobs noted in an interview with *The Wall Street Journal* just under 30 days after the launch of the App Store: “What we’ve tried to do is to construct [...] a frictionless marketing, distribution and transaction system for both the developer and the user so that

⁵²⁷ APL-APPSTORE_00000055-087, at 076. *See also* “Apple Announces iPhone 2.0 Software Beta,” *Apple*, March 6, 2008, available at <https://www.apple.com/newsroom/2008/03/06Apple-Announces-iPhone-2-0-Software-Beta/> (“The iPhone 2.0 beta release includes both the iPhone Software Development Kit (SDK) as well as new enterprise features [...] Starting today, anyone can download the beta iPhone SDK for free and run the iPhone Simulator on their Mac.”).

⁵²⁸ APL-APPSTORE_00000055-087, at 076.

⁵²⁹ APL-APPSTORE_00000055-087, at 068-074.

⁵³⁰ “‘The Mobile Industry’s Never Seen Anything Like This’: An Interview With Steve Jobs at the App Store’s Launch,” *The Wall Street Journal*, July 25, 2018 reprint of an interview from August 7, 2008, available at <https://www.wsj.com/articles/the-mobile-industrys-never-seen-anything-like-this-an-interview-with-steve-jobs-at-the-app-stores-launch-1532527201> (“What we’ve tried to do is to construct [...] a frictionless marketing, distribution and transaction system for both the developer and the user so that the user can get what they want.”).

⁵³¹ “Apple Rings in New Era of Services Following Landmark Year,” *Apple*, January 8, 2020, available at <https://www.apple.com/newsroom/2020/01/apple-rings-in-new-era-of-services-following-landmark-year/>.

⁵³² “Form 10-K For the fiscal year ended September 28, 2019,” *Apple Inc.*, available at <https://www.sec.gov/Archives/edgar/data/320193/000032019319000119/a10-k20199282019.htm>, at p. 19; Declaration of Dr. David S. Evans, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, September 4, 2020 (“Evans Declaration”), at ¶ 19.

⁵³³ “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021.

the user can get what they want. [...] Once your app is developed, to be able to submit it to Apple and have us take care of all of the marketing, wireless distribution, billing and all the transactional stuff for you, and deliver it right on the handset.”⁵³⁴

266. As Apple had done with the design of the iPhone, the App Store further revolutionized the user experience for iPhone users, enabling them to download to their phones a wide range of third-party apps that had been approved by Apple as safe and high-quality.⁵³⁵ Similarly, the App Store granted developers of third-party apps direct access to a large and growing network of iPhone users. Today, users can access over 1.8 million apps, around 84 percent of which are entirely free—just over half of all apps are gaming apps and just a little over a third of those are paid—and developers have direct access to 1.5 billion Apple devices and more than 900 million iPhone users.⁵³⁶

267. In addition, upon launch, the App Store offered innovative features, as compared to app transaction platforms for PCs at the time, both for consumers and developers. For consumers, the App Store was more accessible and secure than PC distribution channels. In particular, downloading and purchasing applications from third-party digital platforms often posed security and scam risks at the time, as many third-party digital transaction platforms

⁵³⁴ “‘The Mobile Industry’s Never Seen Anything Like This’: An Interview With Steve Jobs at the App Store’s Launch,” *The Wall Street Journal*, July 25, 2018 reprint of an interview from August 7, 2008, available at <https://www.wsj.com/articles/the-mobile-industrys-never-seen-anything-like-this-an-interview-with-steve-jobs-at-the-app-stores-launch-1532527201>.

⁵³⁵ See, e.g., “What do the App Store Updates Mean for Your App?” *Clearbridge Mobile*, available at <https://clearbridgemobile.com/what-do-the-app-store-updates-mean-for-your-app/>, accessed on September 12, 2020 (“When it was first introduced in 2008, Apple’s App Store revolutionized the way in which software is bought and sold. The App Store essentially defined the app ecosystem, the process of developing and launching apps, and how users consume content, products, and services.”).

⁵³⁶ Declaration of Philip W. Schiller in Support of Defendant Apple Inc.’s Opposition to Plaintiff’s Motion for a Preliminary Injunction, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, September 15, 2020 (“Schiller Declaration”), at ¶ 3; “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021; Defendant and Counterclaimant Apple Inc.’s Answer, Defenses, and Counterclaims in Reply to Epic Games, Inc.’s Complaint for Injunctive Relief, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, September 8, 2020 (“Defendant’s Answer, Defenses, and Counterclaims”), p. 8 at 10-11 and p. 14 at 6-8. See also “Number of available apps in the Apple App Store from 2008 to 2020,” *Statista*, February 4, 2021, available at <https://www.statista.com/statistics/268251/number-of-apps-in-the-itunes-app-store-since-2008/>.

neglected to thoroughly check the contents of the software they distributed.⁵³⁷ Through its curation and approval processes, the App Store significantly reduced these risks for consumers on mobile devices.⁵³⁸ This increased the trustworthiness and hence the usage of the App Store among consumers, which ultimately benefitted developers as well.⁵³⁹ In addition, the App Store issued guidelines that discouraged copying and in 2011 provided content dispute resolution tools to better protect developers’ intellectual property from piracy.⁵⁴⁰

268. Similarly, the App Store, at its launch, featured innovations that app transaction platforms for gaming consoles lacked. For consumers, the App Store provided a new and valuable way to access games compared to console platforms through lower average consumer

⁵³⁷ Horowitz, Michael, “Be careful when downloading software,” *CNET*, August 20, 2007, available at <https://www.cnet.com/news/be-careful-when-downloading-software/> (“Many download Web sites don’t check software. Like so much else on the Internet, you have to be skeptical about the star ratings of software. Perhaps you suspected this, but now there is proof.”).

⁵³⁸ Goodin, Dan, “Google’s official app market found hosting malicious Android apps—again,” *ArsTechnica*, April 13, 2012, available at <https://arstechnica.com/information-technology/2012/04/googles-official-app-market-found-hosting-malicious-android-appsagain/> (“The repeated discoveries of malware hosted on Google servers underscore the darker side of a market that allows anyone to submit apps with few questions asked. Whatever critics may say about Apple’s App Store, which is significantly more selective about the titles it hosts, complaints about malware aren’t one of them.”); “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021.

⁵³⁹ “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on September 14, 2020, at pp. 4, 7 (“The development of a trusted network allows developers to directly engage with consumers and end users and provides an important foundation for market access, consumer discoverability, product legitimacy, and overall growth [...] Through the guideline language, Apple made clear that its focus is on maintaining the integrity of the device. This stability served to instill consumer trust in the product and directly benefitted the developer community”).

⁵⁴⁰ According to the App Association (an organization representing app makers and connected device companies), developers “faced serious challenges in protecting their products in retail stores because the licensing codes remained active and easy to steal.” See “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on September 14, 2020, at p.3. See also APL-APPSTORE_00046982-988, at 982 (“If you attempt to cheat the system (for example, by trying to trick the review process, steal data from users, copy another developer’s work, or manipulate the ratings) your apps will be removed from the store and you will be expelled from the developer program.”); Panzarino, Matthew, “Apple launches new app and iTunes content infringement, copyright claims tools,” *The Next Web*, August 31, 2012, available at <https://thenextweb.com/apple/2012/08/31/apple-launches-new-app-itunes-content-infringement-copyright-claims-tools/> (“Apple has revamped several forms and tools on its site that developers or content producers can use to submit copyright claims for their apps or content.”).

prices and more convenient payment and app installation methods.⁵⁴¹ In 2008, console platforms generally sold games in brick-and-mortar retail stores and on proprietary digital transaction platforms.⁵⁴² Games sold in brick-and-mortar stores like GameStop and BestBuy came in the form of discs that consumers inserted into standalone game consoles or handheld devices like Nintendo’s Wii, Microsoft’s Xbox 360, and Sony’s PlayStation 3.⁵⁴³ Digital console platforms, including the Xbox 360 Marketplace, the PlayStation Store, and the Wii Channel, offered free demos and paid games to consumers, but paying for the games often took effort.⁵⁴⁴ To purchase paid games, consumers would first pay for points at physical retailers or online, and later redeem them for games: for example, consumers had to buy “Microsoft Points” to pay for games on the Xbox 360 Marketplace and “Wii

⁵⁴¹ Game apps on the App Store sold for \$2.50 on average in 2009. *See* Schonfeld, Erick, “Android and iPhone Apps Cost About The Same, Except For Games And Dictionaries,” *TechCrunch*, August 6, 2009, available at <https://techcrunch.com/2009/08/06/android-and-iphone-apps-cost-about-the-same-except-for-games-and-dictionaries/>. Xbox 360, PlayStation 3, and Wii games online sold for over \$14 on average in 2009. *See* “Xbox 360 Prices & 360 Game List,” *PriceCharting*, available at <https://www.pricecharting.com/console/xbox-360>, accessed on March 13, 2021; “Playstation 3 Prices & PS3 Game List,” *PriceCharting*, available at <https://www.pricecharting.com/console/playstation-3>, accessed on March 13, 2021; “Wii Prices & Wii Game List,” *PriceCharting*, available at <https://www.pricecharting.com/console/wii>, accessed on March 13, 2021.

⁵⁴² Hutsko, Joe, “Downloading: That Other Way to Get a Video Game,” *The New York Times*, March 6, 2008, available at <https://www.nytimes.com/2008/03/06/technology/personaltech/06basics.html> (“The makers of the game consoles, like Xbox 360, PlayStation 3 and Wii, want you to buy discs for new releases [...] [b]ut they do encourage gamers to download old games”).

⁵⁴³ *See, e.g.*, Muskus, Jeff, “New Wii Games Find a Big (but Stingy) Audience,” *The New York Times*, April 21, 2008, available at <https://www.nytimes.com/2008/04/21/technology/21wii.html> (“Nintendo sits atop the home video-game market [...] Take Super Smash Bros. Brawl. [...] ‘We sold a couple thousand copies in the first week,’ said Xavier Pervez, assistant manager at a GameStop in Fairfield, Conn.”); “Repair Form for U.S. Residents,” *Nintendo*, available at https://web.archive.org/web/20081223052430/http://www.nintendo.com/consumer/repair/repair_form_us_ssb.jsp, accessed on March 13, 2021 (“Super Smash Bros. Brawl utilizes a double-layer disc”); Sivaraman, Aarthi and Phil Furey, “‘Grand Theft Auto 4’ hits the streets,” *Reuters*, April 29, 2008, available at <https://www.reuters.com/article/us-media-grandtheftauto-idUSHO93110320080429>.

⁵⁴⁴ *See, e.g.*, “NBA 2K9: Xbox 360 and PlayStation 3 users now able to net the demo,” *GamesIndustry.biz*, October 3, 2008, available at <https://www.gamesindustry.biz/articles/nba-2k9-xbox-360-and-playstation-3-users-now-able-to-net-the-demo> (“2K Sports today announced that a free demo of NBA 2K9 is now available for download on PlayStationNetwork, and is scheduled to be available tomorrow morning on Xbox LIVE Marketplace for the Xbox 360 video game and entertainment system from Microsoft.”); Hutsko, Joe, “Downloading: That Other Way to Get a Video Game,” *The New York Times*, March 6, 2008, available at <https://www.nytimes.com/2008/03/06/technology/personaltech/06basics.html> (“Unfortunately, to buy any of them, Microsoft forces gamers to use an annoying points system that converts \$1 to 80 points.”).

points” to make purchases on the Nintendo Wii.⁵⁴⁵ The App Store, however, enabled consumers to efficiently purchase apps with a safe and familiar one-click installation process on their mobile device.

269. For game developers, the App Store provided a new and valuable way to reach consumers and monetize their apps.⁵⁴⁶ Through the App Store, smaller, independent developers could create and publish games at a lower cost than on consoles.⁵⁴⁷ In addition, the App Store provided game developers access to people who may not have been committed enough to gaming to buy a console but were willing to play games on their phone.⁵⁴⁸ Finally, the App Store allowed game developers to sell directly to consumers, as a result of which they received a higher share of revenue from their game than they did from the traditional game development supply chain of developers, publishers, console manufacturers, and retailers, where they would receive at most 30 to 40 percent of the overall revenue.⁵⁴⁹ In contrast,

⁵⁴⁵ Carless, Simon, “Microsoft Unveils Initial Xbox 360 Marketplace Content,” *Gamasutra*, November 15, 2005, available at https://www.gamasutra.com/view/news/98142/Microsoft_Unveils_Initial_Xbox_360_Marketplace_Content.php (“For pay-to-download titles and elements, Microsoft Points will be available for purchase at participating retail stores and via the Xbox Live Dashboard. In North America, consumers can purchase a card worth 1600 Points for an MSRP of \$19.99, and consumers can buy via the Xbox Live Dashboard in 500 Point increments.”); Allen, Danny, “A Closer Look at the Nintendo Wii,” *PCWorld*, November 17, 2006, available at <https://www.pcworld.com/article/127859/article.html> (“The online shop will operate on a payment system called Wii Points. You’ll be able to purchase Wii Points at retail outlets or with a credit card online.”).

⁵⁴⁶ Yoffie, David B., and Renee Kim, “Apple Inc. in 2010,” *Harvard Business School*, July 7, 2014, at p. 11 (“Apple’s App Store was the first outlet that made it easy to distribute, access, and download applications directly onto the mobile phone [...] Third-party developers also welcomed the App Store because Apple made it easier to reach consumers.”).

⁵⁴⁷ Smaller developers on the App Store could publish games at a cost of a few thousands of dollars compared to the millions that may be required to publish on consoles. *See* Griggs, Brandon, “Developer strikes it rich with iPhone game,” *CNN*, November 18, 2008, available at <https://www.cnn.com/2008/TECH/11/18/iphone.game.developer/index.html> (“It can take dozens of professional developers and millions of dollars to create a video game for a traditional console such as a PlayStation or an Xbox. But the iPhone and the App Store have helped democratize game development by opening the field to any software coder with talent and a clever idea, industry observers say.”).

⁵⁴⁸ Crecente, Brian, “iPhone App Store at 10: How it Changed Gaming, Mobile, Tech Forever,” *Variety*, July 10, 2018, available at <https://variety.com/2018/gaming/features/app-store-10-year-anniversary-interviews-1202869662/> (“‘I absolutely believe that the iPhone and mobile devices as a whole ushered in this new free-to-play popularity,’ Citron said. ‘They made it mainstream and more understandable and comfortable. Traditional games were always more ‘buy a game to play the game’ but with mobile games falling more often into the free-to-play approach, it’s given us all a chance to support game devs based on quality and experience.’”).

⁵⁴⁹ EPIC_03363727-761 at 744; Crecente, Brian, “iPhone App Store at 10: How it Changed Gaming, Mobile, Tech Forever,” *Variety*, July 10, 2018, available at <https://variety.com/2018/gaming/features/app-store-10->

developers on the App Store received a more attractive 70 percent of the revenue generated from their apps.⁵⁵⁰

270. Apple significantly enhanced the App Store for both developers and consumers in 2009, when it enabled in-app purchasing, a major development in the Western online marketplace.^{551,552} Before the availability of this functionality, developers would

year-anniversary-interviews-1202869662/ (“‘The idea of being able to release games directly to the App Store (without needing a publisher), and for users to be able to download and install an app in one touch of a button was a paradigm-shifting moment for the games industry, and for the software industry in general,’ Wood said.”); Sweeney Deposition, at 22:11-22:21 and 24:17-24:24 (“[T]he typical publisher royalties we were aware of from third-party publishers were generally in the 15 to 30 percent range with industry lore that [there] were higher rates available for sufficient prominent product. Q. And, again, just to make sure I’m understanding who’s getting what, when you say the royalties were 15 to 30 percent, that was the percentage that the publishers would pay to the developers? A. Yes. [...] Q. So [...] up until 2008 or so, publishers’ commissions may have increased to 20 or 30 percent as a typical royalty paid to game developers; is that correct? [...] [A.] My understanding is that that was a typical publisher royalty rate in the 2006 time frame.”); Allison Deposition, at 45:8-15 (“Yahoo! had an inverse model at times where they would take 60 percent and give 40 percent to the developers for [...] the pleasure of being distributed on their platform, they would take 60 percent and give 40 percent. These were in the kind of early 2000s.”).

⁵⁵⁰ Yoffie, David B., and Renee Kim, “Apple Inc. in 2010,” *Harvard Business School*, July 7, 2014, at p. 11 (“[Apple] kept a 30% cut of the developer’s app sales.”). *See also* Crecente, Brian, “iPhone App Store at 10: How it Changed Gaming, Mobile, Tech Forever,” *Variety*, July 10, 2018, available at <https://variety.com/2018/gaming/features/app-store-10-year-anniversary-interviews-1202869662> (“And revenue for those who did manage to leverage their way onto a carrier’s mobile phone store was wildly unbalanced, with the carrier often taking as much as 90% of the revenues. The App Store, on the other hand, made it easier to publish a game or other app and Apple took just 30% of sales. ‘This was a huge revolution,’ Carrillo said. ‘It was hard to believe.’”).

⁵⁵¹ The App Store may not have been the very first online marketplace to add this functionality, but in-app purchasing was certainly not widely available. For example, other major platforms introduced this functionality only later: Google Play (then known as the Android Market) and the Samsung Galaxy Store enabled in-app purchasing in 2011, Microsoft enabled it in 2012, and Steam first made it available in free-to-download games in 2011. *See* Chu, Eric, “In-app Billing Launched on Android Market,” *Android Developers Blog*, March 29, 2011, available at <https://android-developers.googleblog.com/2011/03/in-app-billing-launched-on-android.html>; “Samsung Apps Celebrates 2nd Anniversary with New Version of Apps Store,” *Samsung*, September 20, 2011, available at <https://news.samsung.com/global/samsung-apps-celebrates-2nd-anniversary-with-new-version-of-apps-store> (“With the release of In-App Purchase SDK on September 15th”); Warren, Tom “Only Windows Phone 8 will support in-app purchasing,” *The Verge*, August 7, 2012, available at <https://www.theverge.com/2012/8/7/3225120/in-app-purchasing-windows-phone-8-apps-only>; Vilches, Jose, “Steam bets on in-app purchases with free-to-play games,” *TechSpot*, June 15, 2011, available at <https://www.techspot.com/news/44258-steam-bets-on-in-app-purchases-with-free-to-play-games.html> (“[T]his marks the first time Steam will offer games that are free to download and keep, supported solely by micro-transactions.”). It is notable that, as of March 2021, Apple had been granted five patents for its IAP technology and had 12 patent applications pending. *See* Rebuttal Expert Report of James E. Malackowski, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, March 15, 2021, at ¶ 128 (“Apple has 5 U.S. patents referring to In-App Purchase and an additional 12 U.S. patent applications referring to In-App Purchase.”).

⁵⁵² The press treated in-app purchasing as a major development in the online marketplace (though it was already popular in the Asia). *See* Kincaid, Jason, “Apple Announces In-App Purchases For Free iPhone Applications,”

commonly offer both free and premium versions of their apps. The idea was that if consumers liked the free version, they would pay for the premium version, and Apple would earn a commission on the transaction. (This was similar to the strategy that some game developers had employed in the era of brick-and-mortar distribution.⁵⁵³) Of course consumers would have to stop using the app in order to upgrade, a particular inconvenience in the case of games. The addition of in-app purchasing enabled developers to produce only a single app, with multiple enhancements that could be unlocked through in-app purchases. Apple charged the same commission rate for upgrades via in-app purchases as it had charged for upgrades via downloads of premium versions of apps.

271. One of the initial design features of iOS was that it did not—and still does not—enable sideloading of third-party apps.⁵⁵⁴ This was a conscious departure from Apple’s approach when it launched the Macintosh in 1984.⁵⁵⁵ In 1984, online distribution of apps was not technologically feasible, and the risks posed by malware were not as visible as they later became.⁵⁵⁶ Between the time of the launch of the Macintosh in 1984 and the introduction

TechCrunch, October 15, 2009, available at <https://techcrunch.com/2009/10/15/apple-announces-in-app-purchases-for-free-iphone-applications/> (“This is absolutely huge news for developers, and will likely lead to a fundamental shift in the way applications are marketed and priced.”); Rowan, David, and Tom Cheshire, “The app explosion,” *WIRED*, December 22, 2009, available at <https://www.wired.co.uk/article/the-app-explosion> (“In recent months, Apple has allowed “in-app purchasing,” which Stanley sees as game-changing.”); Kromand, Daniel, “What Gamers Think About Microtransactions,” *Gamasutra*, December 3, 2009, available at https://www.gamasutra.com/view/feature/132595/what_gamers_think_about_.php (“Microtransactions can help to revert this trend and revitalize this market segment, but its implementation is still relatively new -- at least in Western game development.”).

⁵⁵³ For example, Epic CEO Tim Sweeney distributed the first episode of his game ZZT for free, and within that episode, offered consumers the chance to buy its sequels. *See* Sweeney Deposition, at 16:8-18 (“I gave the first episode away to gamers for free and gave them all permission to share copies of it with their friends [...] And in this first free episode of the game, I offered customers to buy the two sequels to it by sending a check to -- to my address -- well, my parents’ home address where I lived until 1998.”).

⁵⁵⁴ Sideloading refers to the download and installation of a third-party app not through a designated app store. Costello, Sam “How to Get Apps That Are Not in the App Store,” *Lifewire*, January 1, 2021, available at <https://www.lifewire.com/get-apps-not-in-app-store-1999916> (“Sideloading is the name used for installing apps directly on the iPhone rather than using the App Store.”).

⁵⁵⁵ Johnson, Bobbie, “Apple’s Macintosh, 25 years on,” *The Guardian*, January 23, 2009, available at <https://www.theguardian.com/technology/2009/jan/23/apple-macintosh-25>.

⁵⁵⁶ The first attempt at distributing apps online was in the early 1990s (at least 6 years after the Mac was introduced in 1984). *See* Edwards, Benj, “Before Mac OS X: What Was NeXTSTEP, and Why Did People Love It?” *How-To Geek*, November 7, 2020, available at <https://www.howtogeek.com/698532/before-mac-os-x-what-was-nextstep-and-why-did-people-love-it/> (“One of the first attempts at a digital ‘App Store’ for computer applications debuted on NeXTSTEP in 1991: The Electronic AppWrapper sold commercial

of the iPhone, Apple gained considerable experience with security threats to its users; on the basis of that experience, Apple employed different security measures when designing the iPhone iOS.⁵⁵⁷ Because Apple was starting afresh with the iOS platform, it could implement these additional security features without disrupting any existing functionalities. For instance, Apple gave each member of its iOS Developer Program an electronic certificate, so that Apple could track the source of any malicious applications on the App Store.⁵⁵⁸

272. However, Apple was reluctant to introduce these same measures in the macOS, for fear of disrupting its established functionalities or inconveniencing longstanding macOS developers who were used to certain processes.^{559,560} As C.K. Haun, a director of Apple’s developer technical support team, testified:

packages as digital network downloads managed by encryption and digital rights management.”). Moreover, “[m]alware did not become common until the late 1980s.” See Mell, Peter, Karen Kent, and Joseph Nusbaum, “Guide to Malware Incident Prevention and Handling,” National Institute of Standards and Technology, November 2005, available at <https://www.govinfo.gov/content/pkg/GOVPUB-C13-b4b33e16e70084860f78da16779b0d51/pdf/GOVPUB-C13-b4b33e16e70084860f78da16779b0d51.pdf>, at p. 25.

⁵⁵⁷ Deposition of C.K. Haun, Vol.2, January 14, 2021, at 322:7-19 (“[T]he document says (as read): We thought about the security hazards of the desktop environment, and established a new approach to security in the design of iOS. We developed and incorporated innovative features that tighten mobile security and protect the entire system by default. To the best of your knowledge, was that statement by Apple in September of 2015 correct? A. Yes.”). See also APL-APPSTORE_04650308-367, at 311 (“When we set out to create the best possible mobile platform, we drew from decades of experience to build an entirely new architecture. We thought about the security hazards of the desktop environment, and established a new approach to security in the design of iOS. We developed and incorporated innovative features that tighten mobile security and protect the entire system by default.”).

⁵⁵⁸ APL-APPSTORE_00000055-087, at 079.

⁵⁵⁹ Deposition of Philip Schiller, Vol.1, February 11, 2021, at 226:4-13 (“Q. And were you part of the decision to allow developers to distribute apps to be downloaded and installed into MacBook Pro outside the confines of the Mac App Store? A. So there wasn’t a decision. It was the way the Mac was already designed and architected as a personal computer in general, and as a device that existed before there was an internet. And so just, that is the way it developed and was. There wasn’t a decision to allow or not allow that.”); Deposition of Craig Federighi, Vol.1, February 10, 2021 (“Federighi Deposition, Vol.1”), at 144:16-25. (“Well, that’s a -- that’s a different question. So -- two-part question. So have I said the level [of security on the Mac] is unacceptable? Yes, repeatedly, and we continue to make changes to try to make it acceptable. Have I suggested that we do that by changing the nature of the Mac to eliminate Internet distribution? I have viewed that as inconsistent with the customer proposition and history of the Mac [...].”).

⁵⁶⁰ See Deposition of Timothy Cook, Vol. 1, February 12, 2021, at 38:5-13 (“Q. So why is it that you continue to allow your customers on the MacIntosh to download software from outside the Mac App Store? A. It’s the way that the model was set up initially and never changed and obviously, with a Mac, you’ve got a little bit more degrees of freedom in terms of failure than you do with a phone, which is used in emergency cases and many other cases where you would not want to have an issue.”).

Mac OS was first released to developers for developing application software in 1982. There have been behaviors that have become part of Mac OS from ‘82 to now that in some cases are difficult to change without understanding all the ramifications, and the ramifications can be rather broad, not from necessarily from the operating system’s perspective, but from the perspective of Mac developers who have 30-some-odd years of history of knowing how certain things work, whether that knowledge is accurate or not. When we developed iPhone OS, we did not have an established base of either developer knowledge or existing software applications that this intimate knowledge of what iOS or iPhone OS did, so we could begin a new platform with some enhanced goals and in this case enhanced security in sandboxing infrastructure without disrupting anything that had happened in the past.⁵⁶¹

273. Thus, Apple chose an alternative route to enhancing security for the macOS. Apple first started accepting submissions for Mac applications in 2010⁵⁶² and the online Mac store, where users could find and acquire approved applications, was not opened until 2011.⁵⁶² The following year, the macOS received a new security feature called Gatekeeper, which by default allowed only applications downloaded from the Mac App Store or from developers who were specially certified, and created a warning dialog if the app was not from an identified developer.⁵⁶³ However, users had the option of adjusting the settings to

⁵⁶¹ Haun Deposition, Vol.1, at 185:16-186:9 (“Mac OS was first released to developers for developing application software in 1982. There have been behaviors that have become part of Mac OS from ‘82 to now that in some cases are difficult to change without understanding all the ramifications, and the ramifications can be rather broad, not from necessarily from the operating system’s perspective, but from the perspective of Mac developers who have 30-some-odd years of history of knowing how certain things work, whether that knowledge is accurate or not. When we developed iPhone OS, we did not have an established base of either developer knowledge or existing software applications that this intimate knowledge of what iOS or iPhone OS did, so we could begin a new platform with some enhanced goals and in this case enhanced security in sandboxing infrastructure without disrupting anything that had happened in the past.”). *See also* Deposition of Ron Okamoto, Vol.1, December 16, 2021 (“Okamoto Deposition, Vol.1”), at 73:22-74:5 (“[W]e wanted to create a better solution than what had exhibited before on the PC market. The PC market, if you recall, if you wanted to get software on a device, it was very clumsy and, you know, had some risk with it. We wanted to make sure that the iPhone was a very secure place for both users and developers. For users, for the content and the things that they’re going to access as well as their security”).

⁵⁶² “Apple’s Mac App Store Opens for Business,” *Apple*, January 6, 2011, available at <https://www.apple.com/newsroom/2011/01/06Apples-Mac-App-Store-Opens-for-Business/>.

⁵⁶³ Dormehl, Luke, “Today in Apple history: Apple preps for Mac App Store’s big debut,” *Cult of Mac*, November 3, 2010, available at <https://www.cultofmac.com/452426/tiah-mac-app-store/> (“Apple prepares to launch the Mac App Store, publicly accepting app submissions from registered developers.”). *See also* Federighi Deposition, Vol.1, at 32:8-17 (“[W]e had to introduce the technology because malware has been a persistent problem on the Mac, and Gatekeeper does provide us a degree of deterrents against malware. And it does so, as you say, today involving -- depending on how the user has configured their Mac, it may run, and it may notify them if something they are attempting to install was not signed with a developer certificate and

download apps from any source.⁵⁶⁴ In June 2019, Apple announced that all Mac software distributed outside the Mac App Store must be notarized in order to run,⁵⁶⁵ unless users override the default setting and acknowledge that running unnotarized apps or an app from an unknown developer may harm their Mac or compromise their privacy.⁵⁶⁶

3. *Monetization in the App Store*

274. The App Store’s pricing policy has provided developers with a growing variety of monetization strategies. It is important to note at the outset that the App Store did not charge consumers access fees when it launched, and it still does not.⁵⁶⁷ Developers who intend to submit apps for distribution need to pay a nominal fee of \$99 per year to participate in the Apple Developer Program, and, generally, a 30 percent commission on the price of paid apps and any in-app digital content or services.⁵⁶⁸ Developers in the program

notarized”). *See id.*, at 143:22-144:6 (“Q. Have you ever advocated to anyone within Apple that the situation on -- the security situation on Macs is unacceptable? A. Yes. It’s driven many efforts, like notarization, like Gatekeeper. These were driven out of many of us in the security function believing we can -- we should consistently work to make Mac security better in light of how hostile the external environment is and attacks that users are undergoing.”). iOS does not have Gatekeeper as its existing App Store mechanisms provide better security. *See id.*, at 77:13-78:4 (“Q. Does Apple currently run Gatekeeper in iOS? A. No. Q. And currently it doesn’t because it doesn’t need to; right? A. Correct. The existing App Store mechanisms cover those -- that functionality and more [...]. Q. If Apple were to allow Internet downloading of iOS apps, Apple could implement Gatekeeper functionality on iOS? A. Technically, we could implement something like that. It would dramatically undermine the security of the platform, though”).

⁵⁶⁴ Foresman, Chris, “Mac developers: Gatekeeper is a concern, but still gives power users control,” *ArsTechnica*, February 17, 2012, available at <https://arstechnica.com/gadgets/2012/02/developers-gatekeeper-a-concern-but-still-gives-power-users-control/>.

⁵⁶⁵ “Notarization Requirement for Mac Software,” *Apple*, June 3, 2019, available at <https://developer.apple.com/news/?id=06032019i>.

⁵⁶⁶ “Safely open apps on your Mac,” *Apple*, available at <https://support.apple.com/en-us/HT202491>, accessed on August 4, 2021 (“By default, macOS Catalina and later also requires software to be notarized [...] If you want to open an app that hasn’t been notarized or is from an unidentified developer [...] Go to Security & Privacy. Click the Open Anyway button in the General pane to confirm your intent to open or install the app”).

⁵⁶⁷ APL-APPSTORE_00000055-087, at 074, 076 (“[The] way we are going to do it is what we call the ‘App Store.’ This is an application we’ve written to deliver apps to the iPhone and we are going to put it on every single iPhone with the next release of the software [...] we are going to ship this to every iPhone customer in June and it’s going to be a free software update. So that’s how we are going to roll this out. [applause] In just a few months every iPhone user is going to have everything you saw today right on their phone as a free software update.”). *See also* “Download apps and games on your iPhone or iPad,” *Apple*, available at <https://support.apple.com/en-us/HT204266>, accessed on February 12, 2021.

⁵⁶⁸ “Purchase and Activation,” *Apple*, available at <https://developer.apple.com/support/purchase-activation/>, accessed on February 10, 2021 (“The Apple Developer Program annual fee is 99 USD”); “Membership Details,” *Apple*, available at <https://developer.apple.com/programs/whats-included/>, accessed on February 13, 2020 (“Submit an unlimited number of apps and updates.”).

have access to a host of valuable property and services, including Apple’s software, tools, and other intellectual property. Importantly, developers can use SDKs to develop iOS apps.⁵⁶⁹

275. Since the launch of the App Store, developers have been able to choose a price for their apps from a very wide range of price tiers that include \$0 on the lower end and \$999.99 on the upper end.⁵⁷⁰ Since the App Store’s launch, all changes to Apple’s pricing policy have served to expand business opportunities for developers. Apple has never increased its basic commission rate; in fact, it has reduced its commission in a variety of circumstances, including for its subscription model, small business program, and video partner program, which are described further below.⁵⁷¹ Moreover, in 2009, Apple introduced its In-App Purchase (IAP) functionality, allowing developers to offer customers paid options to unlock additional features within an app.⁵⁷² One commentator described the introduction of IAP as “absolutely huge news for developers.”⁵⁷³ Developers indeed widely welcomed this

⁵⁶⁹ APL-APPSTORE_00000055-087, at 076 (“[S]o how do you become an iPhone developer? It’s really easy. You can go to our Web site, probably starting in about an hour, and download the SDK for free.”). *See also* Fischer Deposition, Vol. 2, at 365:5-6 (“The free program gives them access to tools and technologies, to help them build their apps”); Deposition of Ron Okamoto, Vol.2, December 17, 2020, (“Okamoto Deposition, Vol. 2”), at 415:25-416:4 (“Q. Okay. And so based on your understanding, is a developer able to download and access the Xcode developer tools and develop an iOS app for free? [...] [A.] Yes.”).

⁵⁷⁰ APL-APPSTORE_00000055-087, at 075; Fischer Deposition, Vol.2, at 259:22-261:1 (“We give them a set of a wide, wide, wide range of different price tiers that they can -- that they can select from. [...] Q. Okay. And a developer can pick zero, right? A. Yes, and most of them do. Q. Or 99, right? A. Or 1.99 or 2.99 or 3.99 and all the way up to \$999.99.”).

⁵⁷¹ Fischer Deposition, Vol.2, at 323:13-324:5 (“But the 30 percent is actually what a small group of developers paid, as I discussed, the previous day, we then announced and then since then launched our App Store small business program, which gives developers that earn up to \$1,000,000 in the most recent calendar year, you know, a higher commission to them or a higher payment to them of 85 percent and a reduced commission to us of 15 percent. And that’s going very well and developers are -- many developers are thrilled with the launch of that, and so in that case, developers, you know, for -- for developers that are in the small business program, our commission is 15 percent. And then as I discussed the previous day for subscriptions after one year, the 30 percent commission is reduced to 15 percent. And so at no point over the last 12 and a half years have we increased our commission.”); *See also* Deposition of Carson Oliver, Vol.1, January 26, 2021 (“Oliver Deposition, Vol.1”), at 96:18-23 (“So other than subscriptions, the small business program, the video partner program, or content that is not subject to commission under the Reader Rule or the Multi-Platform Rule, are there other deviations from the 30 percent for digital goods on an iPhone app? A. Not to my knowledge, no.”).

⁵⁷² “The App Store Turns 10,” *Apple*, July 5, 2018, available at <https://www.apple.com/newsroom/2018/07/app-store-turns-10/>. (“With the introduction of in-app purchase (IAP) in 2009, customers could download an app and then pay to unlock different levels and functionality...”).

⁵⁷³ Kincaid, Jason, “Apple Announces In-App Purchases For Free iPhone Applications,” *TechCrunch*, October 15, 2009, available at <https://techcrunch.com/2009/10/15/apple-announces-in-app-purchases-for-free-iphone-applications>.

change, as they could now target users with varying spending propensities and commitment levels with a single app, instead of having to build multiple versions of the app.⁵⁷⁴

276. Apple also provides developers with the option to deliver certain digital content to iOS devices without requiring consumers to purchase the content through the App Store and thus without paying any commission. In 2011, Apple introduced subscriptions and also implemented the “Reader Rule,” which allows developers of magazine, newspaper, book, audio, music, and video apps to deliver subscription content to consumers without requiring the subscription to be offered through the App Store.⁵⁷⁵ The multiplatform rule, which was clarified as its own rule in 2018, allows apps that operate across multiple platforms to deliver content that was acquired in the app but on a different platform, as long as the same content is available for purchase in the iOS app.⁵⁷⁶

277. When offering their apps to users in the App Store, developers can currently choose between the *Free Model*, *Freemium Model*, *Paid Model*, *Paymium Model*, the *Subscription Model*, and hybrids involving features of more than one of these models and/or reliance on

⁵⁷⁴ Chen, Brian X., “Apple Allows In-App Purchases in Free iPhone Apps,” *WIRED*, October 15, 2009, available at <https://www.wired.com/2009/10/in-app-commerce/>. See also Foresman, Chris, “Apple opens in-app purchasing for free iPhone apps,” *ArsTechnica*, October 15, 2009, available at <https://arstechnica.com/gadgets/2009/10/apple-opens-in-app-purchasing-for-free-iphone-apps/>; Griffiths, Rob, “Apple allows in-app purchasing for free App Store apps,” *MacWorld*, October 15, 2009, available at <https://www.macworld.com/article/1143339/appstorepurchasing.html>.

⁵⁷⁵ Foresman, Chris, “Apple quietly drops special subscription requirements for iOS apps,” *ArsTechnica*, June 9, 2011, available at <https://arstechnica.com/gadgets/2011/06/apple-quietly-drops-special-subscription-requirements-for-ios-apps/> (“[A]pps are no longer required to offer an in-app subscription option. Content providers can continue to offer outside subscriptions that are accessible via an iOS app, so long as no external links to outside purchasing mechanisms are built into the app.”); “App Store Review Guidelines” *Apple*, archived June 4, 2018, available at <https://web.archive.org/web/20180604060822/https://developer.apple.com/app-store/review/guidelines/#content-based-reader-apps> (Section 3.1.3(a)).

⁵⁷⁶ “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021 (“3.1.3(b) Multiplatform Services: Apps that operate across multiple platforms may allow users to access content, subscriptions, or features they have acquired in your app on other platforms or your web site, including consumable items in multi-platform games, provided those items are also available as in-app purchases within the app.”). On June 5, 2018, the multiplatform rule was made its own rule; before, users were able to access consumable items in multi-platform games under the “Reader” rule. See “App Store Review Guidelines,” *Apple*, archived on June 4, 2018, available at <https://web.archive.org/web/20180604060822/https://developer.apple.com/app-store/review/guidelines/#content-based-reader-apps>; “App Store Review Guidelines,” *Apple*, archived on June 5, 2018, available at <https://web.archive.org/web/20180605143146/https://developer.apple.com/app-store/review/guidelines/#multiplatform-services>.

advertising revenue.⁵⁷⁷ In the *Free Model*, users get to download and use the app completely free of charge with no optional in-app purchases, and developers obtain distribution services without paying download fees or using IAP.⁵⁷⁸ This model is especially attractive for developers planning to monetize their app by displaying ads within the app or by facilitating the purchase of certain physical goods, as in the case of Uber. A completely free app is likely to attract more users, which in turn increases potential ad revenue. About 84 percent of apps in the App Store employ the *Free Model*,⁵⁷⁹ which provides substantial benefit to consumers. Apple collects zero revenue for the download and usage of such apps, even if developers monetize by collecting display ad revenues, and even though Apple incurs costs when publishing those apps by devoting resources to reviewing those apps and, in many cases, providing server capacity and technical support.⁵⁸⁰ On the other hand, the availability of high-quality free apps attracts consumers to iOS devices and the App Store, and having more App Store users benefits developers.

278. The *Freemium Model* also offers the app to users free of charge and developers—again—obtain app distribution services without paying download fees.⁵⁸¹ However, this model comes with the option of in-app purchases, *i.e.*, users can enable certain features within the

⁵⁷⁷ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021.

⁵⁷⁸ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021; Schiller Declaration, at ¶ 39.

⁵⁷⁹ “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021.

⁵⁸⁰ “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021. Every app in the App Store is reviewed. *See* Deposition of Trystan Kosmyinka, Vol.1, February 2 (“Kosmyinka Deposition, Vol.1”), at 107:2-6 (“[I]s it the case that every app that’s in the App Review [sic] store would had to have gone through the App Review process? A. Yes.”). Apps are “hosted by Apple on the App Store.” *See* “Business,” *Apple*, available at <https://developer.apple.com/business/distribute/>, accessed on July 29, 2021. There is also “unlimited hosting” for apps (*see* “Features,” *Apple*, available at <https://developer.apple.com/app-store/features/>, accessed on July 29, 2021). All members of Apple’s Developer Program have full access to a set of tools and services and no hosting fees. *See* “Membership Details,” *Apple*, available at <https://developer.apple.com/programs/whats-included/>, accessed on February 10, 2021. *See also* Okamoto Deposition, Vol.2, at 316:3-9 (“[I]t costs money for Apple to publish a free app in the App Store, right? [...] [A.] Yes. Because it’s all part of the infrastructure we created for the App Store, it’s supported by that.”).

⁵⁸¹ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021; Schiller Declaration, at ¶ 39.

app by paying a premium.⁵⁸² This model offers a convenient pricing strategy that allows developers to attract price-sensitive consumers that might want to use the app in its basic version while making it easy for avid users of the app to spend to acquire additional special features.

279. In the *Paid Model*, users pay once when they download the app, but are then able to use all features of the app at no additional charge.⁵⁸³ The *Paymium Model* on the other hand, is a combination of the Freemium Model and the Paid Model. Users pay for the download of the app and can then choose to make additional in-app purchases to enable special features within the app.⁵⁸⁴ Developers can also choose a *Subscription Model*, in which users are charged a subscription fee on an ongoing basis.⁵⁸⁵

280. The App Store’s basic pricing policy was established when the Store was launched and iPhones accounted for a small fraction of smartphone sales and almost certainly an even smaller fraction of the installed base of smartphones; changes since then have involved lowering commissions for some classes of transactions and providing developers additional options.⁵⁸⁶ As **Exhibit 1** shows, when the App Store was launched, users could already download games for the major consoles, as well as games and other apps for desktop PCs. The App Store has never charged any commissions on free apps, advertising revenue, or revenue from purchases of physical goods.⁵⁸⁷ When the App Store launched, it charged

⁵⁸² “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021.

⁵⁸³ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021.

⁵⁸⁴ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021.

⁵⁸⁵ “Choosing a Business Model,” App Store, *Apple*, available at <https://developer.apple.com/app-store/business-models/>, accessed on January 29, 2021.

⁵⁸⁶ In the second quarter of 2008, iPhones accounted for 2.8 percent of the global smartphone market, down from 5.3 percent in the first quarter of that year. *See* “iPhone unit shipments as share of global smartphone shipments from third quarter 2007 to second quarter 2020,” *Statista*, November 25, 2020, available at <https://www.statista.com/statistics/216459/global-market-share-of-apple-iphone/>. Since the iPhone had been on the market for less time than major competitive smartphone brands, its installed base share was almost certainly below its sales share.

⁵⁸⁷ “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021; Defendant’s Answer, Defenses, and Counterclaims, p. 44 at 11-12; Schiller Declaration, at ¶ 39.

developers a 30 percent commission on the purchase price of paid apps.⁵⁸⁸ When in-app purchases of digital content became available in 2009, this same commission rate was applied to them.⁵⁸⁹ Since then, the only changes to the App Store’s pricing policy have been *reductions* in commissions under a variety of conditions.⁵⁹⁰

281. Commissions on subscriptions, which were 30 percent for several years, were reduced to 15 percent in June 2016 for subscriptions that extend beyond the first year.⁵⁹¹ Similarly, Apple’s Video Partner Program for developers offering “premium video subscriptions

⁵⁸⁸ APL-APPSTORE_00000055-087, at 075 (“Pick whatever price you want to sell your app at. When we sell the app through the App Store, the developer gets 70% of the revenues right off the top [...] when a developer wants to distribute their app for free, there is no charge for free apps at all.”). *See also* APL-APPSTORE_10137343-388, at 345-346 (“As Your agent and/or commissionaire, Apple shall be solely responsible for the collection of all prices payable by End-Users for Licensed Applications acquired by those End-Users under this Schedule 2 [...] Apple shall be entitled to the following commissions in consideration for its services as Your agent and/or commissionaire under this Schedule 2: (a) For sales of Licensed Applications to End-Users [...] Apple shall be entitled to a commission equal to thirty percent (30%) of all prices payable by each End-User”).

⁵⁸⁹ “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021; “‘The Mobile Industry’s Never Seen Anything Like This’: An Interview With Steve Jobs at the App Store’s Launch,” *The Wall Street Journal*, July 25, 2018 reprint of an interview from August 7, 2008, available at <https://www.wsj.com/articles/the-mobile-industrys-never-seen-anything-like-this-an-interview-with-steve-jobs-at-the-app-stores-launch-1532527201> (“The total revenue has been \$30 million in the first 30 days. Developers get 70% of that.”); APL_APPSTORE_10137264-342, at 268 (“‘Licensed Application’ means an Application that [...] has been selected and digitally signed by Apple for distribution, and includes any additional permitted functionality, content or services provided by You from within an Application using the In-App Purchase API.”); APL-APPSTORE_10137343-388, at 345-346 (“For sales of Licensed Applications to End-Users [...] Apple shall be entitled to a commission equal to thirty percent (30%) of all prices payable by each End-User.”).

⁵⁹⁰ Schiller Declaration, at ¶ 7 (“Apple has never increased this commission rate, and instead has found ways to decrease it in certain contexts.”). Exceptions to the 30 percent commission for digital goods always apply to a class of apps or developers, i.e., apps or developers that fall under one of the specific categories outlined in the App Store review guidelines; no individual app or developer has ever negotiated a special exception. *See* Oliver Deposition, Vol.1, at 96:25-97:5 (“Q. To your knowledge, other than categorically, are there individual apps or individual developers who at any point have negotiated for a deviation from a 30 percent for digital goods or services? A. No, not to my knowledge.”).

⁵⁹¹ *See* APL-APPSTORE_10137343-388, at 346 (“Solely for auto-renewing subscription purchases made by customers who have accrued greater than one year of paid subscription service within a Subscription Group (as defined below) and notwithstanding any Retention Grace Periods, Apple shall be entitled to a commission equal to fifteen percent (15%) of all prices payable by each End-User for each subsequent renewal.”). *See also* “Principles and Practices,” App Store, *Apple*, available at <https://www.apple.com/mz/ios/app-store/principles-practices/>, accessed on January 29, 2021 (“In that case, developers earn 70% of subscription sales for the first subscription year, and Apple collects a 30% commission. After the first year, the developer earns 85% for all successive years that the user remains a subscriber, and Apple collects a 15% commission”); Statt, Nick, “Google Matches Apple by Reducing Play Store Fee for Android App Subscriptions,” *The Verge*, October 19, 2017, available at <https://www.theverge.com/2017/10/19/16502152/google-play-store-android-apple-app-store-subscription-revenue-cut>.

services” features a 15 percent commission.⁵⁹² In addition, Apple’s “Reader Rule” allows consumers to access content (specifically: magazines, newspapers, books, audio, music, or video) in apps that they have previously purchased outside those apps, even if those items are not available for purchase in the iOS app; in those circumstances, Apple receives no commission.⁵⁹³ Other apps, which do not qualify for the Reader Rule, may nevertheless be subject to the Multi-Platform rule, which allows users to “to access content, subscriptions, or features they have acquired in [a developer’s] app on other platforms or [a developer’s] web site, including consumable items in multi-platform games, provided those items are also available as in-app purchases within the app.”⁵⁹⁴ Those apps, too, do not pay a commission to Apple when such content is accessed.⁵⁹⁵

282. Most recently, in November 2020 Apple introduced the Small Business Program, which reduced the commission rate on paid apps and in-app purchases to 15 percent for developers that have proceeds from the App Store of less than \$1 million USD a year for all apps combined.⁵⁹⁶ This program should encourage and enable small businesses to develop

⁵⁹² Oliver Deposition, Vol.1, at 84:8-22 (“A. There is another program called the Video Partner Program which provides a reduced 15 percent commission as part of the benefits of that program [...] it is generally a program that is available to premium video subscription services that are integrated within the TV app and are available on Apple’s platforms. Q. And the apps that qualify or the developers that qualify for the video partner program get 15 percent from day 1 for those subscriptions? A. Yes, that is correct.”).

⁵⁹³ Oliver Deposition, Vol.1, at 85:14-86:2 (“A. The Reader Rule allows for digital goods and services to be consumed within apps that are purchased outside of those apps [...] If a user purchases the digital good and service outside of the app, and that can be on their iOS device outside of the app, for example, on Web, Apple would not take a commission on that sale of that digital good or service, even when it is consumed within the app.”) and 94:3-7 (“It’s my understanding that for the Reader Rule, the developer would not be required to sell that same digital good or service within the app that users are able to use and consume within the app even though it was purchased elsewhere.”); “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021.

⁵⁹⁴ Oliver Deposition, Vol.1, at 92:24-93:1 (“If an app is not subject to the Reader Rule, they would be subject to the Multi-Platform Rule.”); “App Store Review Guidelines,” *Apple*, Section 3.1.3 Other Purchase Methods and Section 3.1.3(b) Multiplatform Services, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021.

⁵⁹⁵ Oliver Deposition, Vol.1, at 91:19-92:2 (“The other is related, and it is called the ‘Multi-Platform Rule.’ [...] It is very similar to the Reader Rule in that digital goods and services that are purchased outside of the App Store-distributed app are not required to use Apple’s in-app purchasing or commerce system and are, therefore, not subject to the commission rate for the App Store.”).

⁵⁹⁶ “Apple announces App Store Small Business Program,” *Apple*, November 18, 2020, available at <https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/>; “App Store Small Business Program,” *Apple*, available at <https://developer.apple.com/app-store/small-business-program/>, accessed on February 12, 2021.

iOS apps. In Apple’s words, “small developers and aspiring entrepreneurs will have more resources to invest in and grow their businesses in the App Store”⁵⁹⁷ If they are successful—and outgrow this program—they and Apple iOS users will all benefit. Over 90 percent of all developers are eligible for the Small Business Program, and tens of thousands of developers had already enrolled as of mid-May, with many more still eligible to do so.⁵⁹⁸

283. In addition, apps selling physical goods through the app and apps that monetize via in-app advertisements do not pay any commissions to Apple. However, Apple could certainly choose to extend its current commission structure to include such apps. Charging for in-app advertisements along with other sources of revenue is neither uncommon nor generally raises any anti-competitive concerns. For example, Epic’s Unreal Engine charges large developers a seemingly comprehensive royalty fee of 5 percent on developer revenues including, for instance, any “revenue from in-app advertising.”⁵⁹⁹

D. Two-Sided Transaction Platform Analysis of the App Store

284. In **Section III**, I discussed in detail the fundamental features of two-sided transaction platforms and how they can be identified and differentiated from one-sided business models. Specifically, I identified three fundamental features of two-sided transaction platforms:

- vi. Like other platforms, two-sided transaction platforms need to adopt pricing strategies, service provision strategies, and rules of behavior to attract two distinct groups of users and to facilitate productive interactions between them.

⁵⁹⁷ “Apple announces App Store Small Business Program,” *Apple*, November 18, 2020, available at <https://www.apple.com/newsroom/2020/11/apple-announces-app-store-small-business-program/?afid=p239%7C10078&cid=aos-us-aff-ir>.

⁵⁹⁸ Trial Testimony of Philip Schiller, *Epic Games, Inc. v. Apple, Inc.*, No. C-20-5640 YGR, May 17, 2021, at 2813:21-2814:16 (“Q. And what percentage of developers are eligible for the small business program? A. Over 90 percent of all developers. [...] Q. And what percentage of eligible developers, or any yardstick you wish to apply, my question really is how many developers have enrolled? A. We have tens of thousands in it at this point. Q. And is that a -- a majority or a minority of those who are eligible? A. I think it’s still a minority of those eligible.”).

⁵⁹⁹ “Unreal Engine End User License Agreement For Publishing,” *Unreal Engine*, available at <https://www.unrealengine.com/en-US/eula/publishing>, accessed on March 8, 2021.

- vii. Two-sided transaction platforms derive substantial value from strong bilateral indirect network effects.
- viii. Two-sided transaction platforms have as their main purpose the facilitation of observable transactions that simultaneously connect members of the two groups of users. These are often, but not always, sales transactions.

285. The iOS App Store displays all three of these fundamental features and is thus clearly a two-sided transaction platform. This fact was accepted by both sides in the *Epic* litigation.⁶⁰⁰ First, to be viable, the App Store needs to attract both consumers and developers. Second, there are clear bilateral indirect network effects here: consumers want access to good apps (and the more good apps they have access to, the better), and developers want access to as many potential customers as possible. Third, the App Store generates value for both groups of customers when there is a transaction between a consumer and a developer—a download or an in-app purchase of digital content from a developer. In contrast, a predominantly brick-and-mortar retailer like GameStop does not exhibit these fundamental features of a two-sided transaction platform.⁶⁰¹ Like a bookstore, GameStop buys its products (games) directly from manufacturers and game publishers and sells them to consumers with a markup. Hence, there is no direct, observable transaction between consumers on one side and manufacturers and game publishers on the other side, a key defining feature of two-sided transaction platforms.

1. The App Store Facilitates Interactions Between Developers and End-Users

286. With the launch of the App Store, Apple established a two-sided iOS platform that thrives based on the participation of both developers and device users, participation that the App

⁶⁰⁰ Schmalensee Written Direct Testimony, at ¶ 44 (“The App Store displays all three of these fundamental features and is thus clearly a two-sided transaction platform.”); Evans Written Direct Testimony, at ¶ 92 (“App distribution, in the absence of restraints, is typically provided by a mixture of app stores (which are two-sided transaction platforms), single-sided retailers, direct-to-user downloads, and pre-installation.”).

⁶⁰¹ Although GameStop has introduced a digital store, its online channels account for only 20 percent of its revenue. See Brustein, Joshua, “GameStop Looks to a Digital Future,” *Bloomberg*, November 20, 2020, available at <https://www.bloomberg.com/news/newsletters/2020-11-20/gamestop-looks-to-a-digital-future> (“Last quarter brought an 800% spike in digital sales—bringing online channels to about 20% of GameStop’s total revenue.”).

Store facilitates.⁶⁰² To remain competitive, Apple must continuously think about how to attract users and developers, and may apply different strategies over time or across product types.^{603,604} For example, Apple may decide that gamers are an important source of growth and so may compete aggressively to attract app developers that develop popular videogames. In fact, games are the biggest part of the App Store in driving revenue—in 2019, games accounted for 68 percent of the App Store’s total billings of [REDACTED]—and are displayed in their own distinct section, the “Games” tab.^{605,606} At the launch of the iOS platform, Apple highlighted “what a great gaming device the iPhone with iOS was.”⁶⁰⁷

287. One initiative that Apple has taken to make the iPhone live up to this description has been to actively court game developers. It worked to persuade Epic to offer its games on the iOS

⁶⁰² Evans Declaration, at ¶ 7 (“Software platforms [...] are two-sided businesses that facilitate connections between consumers who want to use applications and developers who want to write applications for those consumers.”); Evans, David S. et al., *Invisible Engines*, The MIT Press, 2006, at p. 55. [REDACTED]

⁶⁰³ See, e.g., APL-APPSTORE_09808181-185, at 182-183 (“Also, we have heard from lots of developers since the launch of iPhone 6 and 6 Plus that it would be helpful to allow a device restriction option. Our current situation can lead to a subpar user experience with customers downloading games that don’t work well on their older devices, which in turn can lead to lots of negative customer reviews [...] Phil - are you supportive of upping the binary size restriction to 4 GB to be competitive with Google?”); APL-APPSTORE_09416561-562, at 562 (“Here’s a thoughtful list of ‘10 Things Google Play Does Better than the App Store’ from one of our developers. There are many good ideas in here (including several we’ve discussed.)”); APL-APPSTORE_09137124-199, at 179 (“How are we helping our customers find great apps?”) and 182 (“Are we giving developers the tools they need to be successful?”). See also Fischer Deposition, Vol.1, at 95:10-16, (“Q. So is it -- is it not relevant to your business at the App Store whether or not the same app on a different platform might be priced differently? A. No. I would say it’s very relevant to my business. We’re incredibly -- we’re an incredibly competitive market and we’re always competing for customers and developers.”); and Fischer Deposition, Vol.2, at 282:9-15, (“We certainly watch very closely how, you know, from -- from third party, you know, research companies, what type of activity we’re seeing on competitive platforms like Android with Google Play and with some of the Chinese Android App Stores, you know, we look at that stuff very closely.”).

⁶⁰⁴ The Epic Games Store is also a two-sided platform. See Allison Deposition, Vol.1, at 59:4-7 (“Q. Because in order for a platform like Epic Games Store to be successful, it has to be able to attract both developers and players, correct? A. Correct.”).

⁶⁰⁵ See APL-APPSTORE_08932378-553, at 382-384. See also Fischer Deposition, Vol.1, at 75:16-19 (“Q. Well, games are, in fact, the largest driver of revenue for the App Store; is that right? A. Games is the -- is the biggest part of the App Store, yes.”).

⁶⁰⁶ “Apple unveils all-new App Store,” *Apple*, June 5, 2017, available at <https://www.apple.com/newsroom/2017/06/apple-unveils-all-new-app-store/> (“Games is the most popular category on the App Store, and with the new design there will now be a dedicated home just for games.”).

⁶⁰⁷ Okamoto Deposition, Vol.2, at 324:8-10 (“Because when the iOS platform first came out, one of the things that we highlighted was what a great gaming device the iPhone with iOS was.”).

platform, for instance, as Epic’s “strong titles” would make the platform more attractive to users, and thus encourage them to buy more iOS devices.⁶⁰⁸ In that context, Apple competes with PlayStation, Nintendo, Xbox, and Android handset makers such as Samsung to make Fortnite as positive an experience as possible on iOS devices, so as to attract gamers to transact through the iOS platform.⁶⁰⁹ In other contexts, e.g., email applications, Apple competes with other handset manufacturers as well as manufacturers of tablets, laptops and desktop computers to attract email developers on the one hand, and consumers who wish to be able to send secure emails conveniently. Likewise, if an app contains content that is also available in e-books, Apple competes with e-book platforms to attract the content developers and the consumers who wish to read the content.

a) The App Store must attract and retain end-users

288. The more different things a smartphone can do, the more valuable it is to consumers. The more attractive apps on a consumer’s iPhone, the more valuable it is. Apple thus benefits when consumers visit the App Store; download digital content, free or paid; come away with iOS devices that third-party developers have helped to make more valuable; and spread the word about their amazing iOS device. This drives device sales. Worries about security and privacy could keep consumers from using the App Store. If it is difficult or expensive to find interesting apps, consumers would also be reluctant to visit. To attract and retain end-users, the App Store has had to deal with all these issues.

⁶⁰⁸ Okamoto Deposition, Vol.2, at 324:4-325:10 (“Q. Has Apple ever wanted Epic to create products for the iOS platform? A. Yes. Q. Why did Apple want Epic Games to do that? A. Because when the iOS platform first came out, one of the things that we highlighted was what a great gaming device the iPhone with iOS was. Epic is a very well-known developer that had some very strong titles on it and we thought it would be great if they would offer them on the iOS platform. Q. Why would it be great if Epic did offer those games on the iOS platform? A. Because we were looking for some of the best things that we could put on the platform, and so our goal was to get some of the best things that we could find and put them on the iOS platform. Q. And is that because doing so would attract users to the iOS platform? A. Yes. If the popular games they’re playing from developers and titles that they love were on iOS, we think it would be attractive for our users. Q. And if you made it attractive for users, you would sell more iOS devices, right? [...] [A.] If we made it attractive to users, we would definitely make the platform more attractive to everybody, and therefore, hope that they would come to it. [...] Q. By ‘come to it,’ you mean buy devices, buy iOS devices? A. Yes.”).

⁶⁰⁹ One example of an attempt to drive “continued innovation in the gaming space in the App store,” has been the decision “to increase the maximum allowable binary size on the [...] App Store,” because limiting binary size for games on the App Store risks “not being able to have interesting games or interesting things that have large payloads [and] realistic rendering.” See Shoemaker Deposition, Vol.2, at 532:9-13 and 534:4-535:1.

289. Apple has understood that consumers value security and privacy of their information, and it has responded accordingly.⁶¹⁰ The surveys conducted by Professor Simonson indicate that many consumers who transact on the App Store value security and privacy very highly. When asked to allocate 100 points across thirteen features of the Apple App Store, respondents who purchased apps or made in-app purchases allocated the most points to privacy (16 points on average) and malware protection (11 points on average).⁶¹¹ Furthermore, when asked what are the “must-have” features, 87.2% and 73.8% of respondents listed privacy and malware protection respectively.⁶¹² The privacy and malware protection are two features respondents are least willing to compromise.⁶¹³ Internal surveys conducted by Apple show similar results. The surveys show that consumers are satisfied with the security and privacy that Apple provides: the majority of iPhone users expressed satisfaction with the security and the privacy of their personal information on iOS,⁶¹⁴ and 84 percent of iPad owners report that the security and privacy of their information was an important factor in their decision to purchase the iPad.⁶¹⁵ For example, Epic CEO Tim Sweeney noted in his deposition that “user privacy and security are fundamental differentiators for Apple,”⁶¹⁶ and that he prefers to use the iPhone himself

⁶¹⁰ See also Sweeney Deposition, at 170:12-171:17 (“Q. [...] Mr. Sweeney, you understand the protection of users’ privacy and security is a fundamental value of Apple’s, don’t you? A. Yes, and at Epic’s as well. Q. And that Apple has built its brand and reputation around those principles? A. I understand that user privacy and security are fundamental differentiators for Apple. Q. And you as CEO of Epic would agree that the protection of user’s privacy is a worthwhile goal, correct? A. Absolutely. Q. And that many consumers place a very high value on having their personal information and privacy protected, true? A. Yes [...] Q. As you sit here today, do you think Apple deserves praise for not profiting off of people’s data? [...] [A.] With respect to consumer data and consumer data privacy, yes.”).

⁶¹¹ The features are privacy, malware protection, number of free apps, quantity and variety of apps, app ratings and reviews, app descriptions and details, search functionality, app-by-app quality control, subscription management, family sharing, app icons, app recommendations, and parental controls. See Simonson Report, at Exhibit 6.

⁶¹² Simonson Report, at Exhibit 11.

⁶¹³ Simonson Report, at Exhibit 11.

⁶¹⁴ APL-APPSTORE_10338845-9307, at 114.

⁶¹⁵ APL-APPSTORE_10337072-319, at 095.

⁶¹⁶ Sweeney Deposition, at 170:20-21 (“I understand that user privacy and security are fundamental differentiators for Apple.”).

in part because “Apple’s approach to privacy is superior to Google’s approach to customer privacy and customer data.”⁶¹⁷

290. This is an on-going focus; Apple must continuously work on upholding its high privacy standards as new challenges keep arising. For instance, in January 2021, Apple announced the introduction of a new privacy protection feature called “App Tracking Transparency” with their next beta update.⁶¹⁸ This feature “will require apps to get the user’s permission before tracking their data across apps or websites owned by other companies.”⁶¹⁹
291. As noted above, the App Store has been reviewing apps since its inception. In the first instance this is an inconvenience for some developers, but it provides consumers assurance that the products on offer perform as advertised and don’t contain malware. Put another way, Apple’s guarantee of quality makes apps more attractive to consumers, benefitting app developers as a group.
292. Over time, Apple also introduced significant changes to the functionality and the design of the App Store to make it more appealing to end-users. For example, in 2016, Apple introduced a new functionality that filtered out apps that end-users had already installed, in order to help them “discover more new apps, and not see apps they already own.”⁶²⁰ In 2017, the App Store underwent a significant redesign to make it easier for users to discover its apps and games.⁶²¹ The redesigned store had a new distinct section for games, a new tab that highlighted any updates in existing apps, new app product pages that featured an app’s ratings, reviews and other accolades more prominently, and it also made in-app purchase options easier for users to discover.⁶²² As another example, Apple significantly invested in

⁶¹⁷ Sweeney Deposition, at 177:15-20 (“A. Yes. I personally prefer to use iPhone. Q. And is part of that because it protects your privacy and is a secure system? A. I find Apple -- well, yes, I find Apple’s approach to privacy is superior to Google’s approach to customer privacy and customer data.”).

⁶¹⁸ “A Day in the Life of Your Data: A Father-Daughter Day at the Playground,” *Apple*, January 28, 2021, available at https://www.apple.com/privacy/docs/A_Day_in_the_Life_of_Your_Data.pdf, at p. 7.

⁶¹⁹ “A Day in the Life of Your Data: A Father-Daughter Day at the Playground,” *Apple*, January 28, 2021, available at https://www.apple.com/privacy/docs/A_Day_in_the_Life_of_Your_Data.pdf, at p. 7.

⁶²⁰ APL-APPSTORE_10236808-945, at 902.

⁶²¹ “Apple unveils all-new App Store,” *Apple*, June 5, 2017, available at <https://www.apple.com/newsroom/2017/06/apple-unveils-all-new-app-store/>.

⁶²² “Apple unveils all-new App Store,” *Apple*, June 5, 2017, available at <https://www.apple.com/newsroom/2017/06/apple-unveils-all-new-app-store/>.

its editorial curation by committing to create “original stories every single day about apps, games and developers” in 2018.⁶²³ Internal documents show that Apple conducted such efforts to attract more end-users, to increase user-time spent on the App Store, and to facilitate more downloads.⁶²⁴

293. Critically, the competition between software platforms does not end when one platform’s app is selected and downloaded by a user at some point in time. In fact, many users own devices running on multiple operating systems, and can choose whether to use Device A or Device B to play a game, draft an email, etc. Hence, the platforms compete for usage *in addition to* app transactions, because, as I discuss below, declining usage will reduce the attractiveness of the platform to developers.

b) The App Store must attract and retain developers

294. Through the App Store, Apple must also provide app developers incentives to develop and maintain their apps for the iOS platform, instead of competing platforms such as Android or Windows or, in the case of games, the Xbox, Switch, or PlayStation systems. As Apple notes in its 2019 Form 10-K: “The Company believes the availability of third-party software applications and services for its products depends in part on the developers’ perception and analysis of the relative benefits of developing, maintaining and upgrading such software and services for the Company’s products compared to competitors’ platforms, such as Android for smartphones and tablets and Windows for personal computers.”^{625,626} Competing platforms do not generally seek to persuade developers permanently to abandon rival platforms. Sometimes Apple, Google, Samsung, and other platforms seek to persuade a developer to develop for its platform first, to provide content

⁶²³ APL-APPSTORE_09769981-074, at 000.

⁶²⁴ APL-APPSTORE_09769981-074, at 999 (“Another goal was to get our customers to visit the store more often. Nearly 70% of weekly visitors now come back 2 or more times each week, up 17 points. And when they visit, it’s easier than ever for them to discover great apps and games, demonstrated by the increase in our download conversion rate, up 12 points to 54%. And customers are spending more than double the amount of time on the App Store each week, now more than 5 minutes.”).


⁶²⁵ “Form 10-K For the fiscal year ended September 28, 2019,” *Apple Inc.*, available at <https://www.sec.gov/Archives/edgar/data/320193/000032019319000119/a10-k20199282019.htm>, at p. 11.

⁶²⁶ Other common reasons that drive consumers’ decision to buy an iPhone include its battery life, reliability, durability, speedy performance, ease of use, and the security and privacy of user information. *See* APL-APPSTORE_10336676-071, at 685 and 687.

that differentiates it from other platforms, or to provide exclusivity for a limited period.⁶²⁷
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295. To attract and retain developers, Apple provides technical resources free of charge to developers that help them successfully develop their iOS apps, which has resulted in satisfaction among app developers. For example, Apple introduced “a new StoreKit tool in Xcode [that] lets developers simulate subscription setup, in-app purchases, and even refunds.”⁶²⁹ Xcode, Apple’s integrated development environment, contain tools that enable developers to build, test, optimize, and submit apps to the App Store for all Apple

⁶²⁷ For example,



⁶²⁸ The Epic Games Store has several exclusivity agreements with developers for a limited time. *See* Sweeney Deposition, at 210:9-13 (“Q. Very good. And you have exclusivity agreements with developers for PC and Mac games? A. Yes, the numerous games in the Epic Games Store are under Epic’s PC platform, a limited time”). *See also* Allison Deposition, Vol.1, at 61:5-12 (“Q. And how long were the exclusivity agreements at Epic typically entered into for EGS? A. The majority of our agreements are -- are 12 months. Some are longer and occasionally have been shorter, but that’s -- that’s an exception rather than an approach. We tend to stick to 12 -- 12-month exclusives in, you know, 95 percent of the time.”).

⁶²⁹ “Apple Reveals New Developer Technologies to Foster the Next Generation of Apps,” *Apple*, June 22, 2020, available at <https://www.apple.com/newsroom/2020/06/apple-reveals-new-developer-technologies-to-foster-the-next-generation-of-apps/>.

devices.⁶³⁰ These tools are often utilized by developers and help them succeed.^{631,632} Apple continues to add new products to its existing developer kit to make it easier for developers to submit apps to the App Store.⁶³³

296. In general, developers report satisfaction with Apple’s developer resources. In a 2018 survey of iOS app developers conducted by Apple, almost two-thirds were satisfied with the tools and services that Apple provides as a development platform.⁶³⁴ As just one example, an Epic engineer stated that “getting Fortnite running on iOS using Metal [a graphics framework provided by Apple] was a very positive experience and, again, easier than the experience we had on Android platforms” and that working with Metal “was a dream [...] compared with working with OpenGL on Android” as it allowed Epic to bring Fortnite to iOS faster and at a higher quality than what they could bring to Android using OpenGL.⁶³⁵ Additionally, in order to ensure that developers can successfully publish their apps on the App Store, Apple strives to communicate with developers to guide developers whose apps have been repeatedly rejected, and explains the reason for rejection.⁶³⁶ Apple also hosts its Worldwide Developer Conference annually, which provides additional in-

⁶³⁰ “Xcode,” *Apple*, available at <https://developer.apple.com/documentation/xcode/>, accessed on September 11, 2020.

⁶³¹ For example, 73 percent of large developers have used TestFlight, a tool to test preliminary versions of iOS apps. *See* APL-APPSTORE_09126673-774, at 769.

⁶³² Two thirds of developers say that “the App Store provides tools to successfully develop apps.” *See* APL-APPSTORE_09126673-774, at 747.

⁶³³ APL-APPSTORE_08932378-553, at 457.

⁶³⁴ APL-APPSTORE_09584333-394, at 346.

⁶³⁵ Deposition of Nicholas Penwarden, Vol.1, January 26, 2021, at 62:16-19 (“However, I would also say that getting Fortnite running on iOS using Metal was a very positive experience and, again, easier than the experience we had on Android platforms.”) and 63:10-13 (“I would agree with working with Metal has been a dream -- or, in this case, was a dream compared with working with OpenGL on Android.”) and 66:2-16 (“Q. Okay. And then the next part of that email says, ‘Here is a starting point: The performance and features of Metal allowed us to bring the full Fortnite Battle Royale experience to iOS quickly and at higher quality than is possible with OpenGL.’ [...] And do you still agree with that sentence today? A. I do, with the same context that I gave above.”).

⁶³⁶ Shoemaker Deposition, Vol.2, 508:1-8 (“Some of the other ones is that an app that continually gets rejected time and time again for the same issue basically means that developer doesn’t understand what the issue was; so we instituted a policy to call the developers back after the second subsequent rejection for the same reason. I think we later changed that to three because of time concerns. I’m sorry. Because of resource demands.”) and 511:22-24 (“To me, this made no sense not to call them. We should call every developer whose app gets removed from the store.”). *See also* Okamoto Deposition, Vol.1, at 119:9-13. (“We like giving developer communication that explains to them why the app was rejected, so they understood the reason.”).

person support to developers.⁶³⁷ Apple regularly encourages developers to utilize new features in the iOS system in order to attract other developers to the platform.⁶³⁸

297. In addition to technical support, Apple also provides business and marketing resources free of charge to developers to ensure their commercial success on the App Store. Apple assists developers in conducting business reviews to break down how their apps perform in terms of user acquisition, user engagement, and monetization as compared to internal benchmarks, which helps developers grow their businesses.⁶³⁹ Developers receive “ongoing marketing and editorial support around content and feature beats for subscription apps, which helps to demonstrate the ongoing value to the user base of the subscriptions through the store and of those apps more generally.”⁶⁴⁰ Apple has increased the number of payment methods that users can keep on file, which has helped developers retain paying customers by significantly reducing the amount of involuntary churn for subscriptions (a

⁶³⁷ Shoemaker Deposition, Vol.2, at 527:5-17 (“A. It [...] is very important. [...] For every ten attendees we had one Apple engineer there to be able to help answer questions. The [...] labs were where a lot of developers would go to get questions answered, including from people like myself, but also from the senior engineers working on -- on implementing the operating system. It is very important. It was a big thank you and a big communication method for Apple’s worldwide developer relations team.”).

⁶³⁸ Shoemaker Deposition, Vol.2, at 531:6-20 (“[T]he partnership management team, engineering team at Apple would work with some of those high-level partners to show them the correct way of implementing a feature, and -- and at the same time those developers [...] are implementing those features early on will show Apple a few things on how to implement it in creative ways. And to me, it was always a win/win. Those developers get face-to-face time with Apple engineers on implementing features, and they give a lot of feedback to Apple. And Apple gets to demo those apps as part of WWDC. To me, it was -- it was always a good thing.”); Deposition of Shaan Pruden, February 11, 2021, at 133:21-135:3 (“Q. And I think your earlier testimony, you said as a part of your duties, you communicate almost on a daily basis with developers; is that fair to say? A. That is correct [...] Q. Okay. And that -- that communication with the developers is basically making the developers aware of what new developments and new products and technology Apple has; correct? A. That’s part of it, yes.”); *Id.*, at 150:5-9 (“Q. So it’s fair to say that in contacting the developers, you are encouraging - - encouraged that your newest product and your newest technology; is that correct? A. That is a function of our team.”).

⁶³⁹ Oliver Deposition, Vol.1, at 52:20-54:13 (“[The monetization] team is responsible for understanding kind of how apps and games grow and make money on our platform, kind of at a microlevel, how individual apps and games improve their business with the store [...] they work with a variety of different cross-functional teams to understand which insights would be most valuable to developers and the business. [...] the scaled engagement team may work with the monetization team to build case studies around different features that have rolled out for developers to help them understand the value of future adoption.”).

⁶⁴⁰ Oliver Deposition, Vol.1, at 162:14-163:2 (“The App Store and Apple does a variety of things to help retain customers as subscribers for those who are subscribed through the App Store [...] A. One example would be ongoing marketing and editorial support around content and feature beats for subscription apps, which helps to demonstrate the ongoing value to the user base of the subscriptions through the store and of those apps more generally.”).

phenomenon where a customer’s payment attempt for a subscription fails, leading to its cancellation).⁶⁴¹ Other marketing support that Apple offers developers include customized product pages and App Clips, mini versions of apps that let users discover, access, and use apps more quickly.⁶⁴² In addition to highlighting new apps in the App Store to help their developers acquire users, Apple has also invested more in highlighting content in existing apps to sustain long-term user engagement for those apps.⁶⁴³ Sixty-four percent of developers use Apple’s sales and trends reports.⁶⁴⁴ Thirty-two percent of all U.S. developers use Apple as a resource to determine which international markets to enter, while only twenty-one percent use Google Play and even fewer use Amazon or Microsoft as a resource for such decisions.⁶⁴⁵ Seventy percent of all developers have used App Analytics on iTunes connect, a tool that Apple continues to improve.⁶⁴⁶ Apple also invests in various Anti-Fraud initiatives to improve developers’ experience on its platform. These include measures to remove spam among customer reviews, and tools like Secure Enclave to protect the content sold by developers from being stolen by fraudsters.⁶⁴⁷

⁶⁴¹ APL-APPSTORE_08932378-553, at 521 and 524. *See also* Oliver Deposition, Vol.1, at 163:8-20 (“Q. What does that mean? How does your commerce platform help retain subscribers over time? A. [...] One example is we allow users to put multiple payment methods on file. And the benefit for a subscriber in that instance is if their first payment method were to fail, for example, the secondary payment method on file would potentially or would then be able to be used to make sure that they did not lose their active subscription during that period of time. So it reduces involuntary churn for subscription developers.”).

⁶⁴² APL-APPSTORE_08932378-553, at 428 and 459-460. *See also* “Use App Clips on iPhone,” *Apple*, available at <https://support.apple.com/guide/iphone/use-app-clips-iphb3a73ec53/ios>, accessed on February 5, 2021.

⁶⁴³ Deposition of Carson Oliver, Vol.2, February 1, 2021 (“Oliver Deposition, Vol.2”), at 422:5-422:10 and 424:14-424:20 (“So one of the things that we’ve done subsequent to the redesign has been to really go deeper on those in-app content experiences that we have in the store or in the apps themselves and really to highlight them much more prominently on the store [...] if you go to the store today, you can see many of the things that are being highlighted by our editorial team are not new apps and games, but they’re actually, kind of, sustaining content moments that our customers, existing or new customers, may be interested in, and which kind of drive further engagement for those apps over time.”).

⁶⁴⁴ APL-APPSTORE_09583918-980, at 938.

⁶⁴⁵ APL-APPSTORE_09584333-394, at 374.

⁶⁴⁶ APL-APPSTORE_06387768-808 at 801; APL-APPSTORE_08932378-553, at 475.

⁶⁴⁷ [REDACTED]

2. *Like the iOS Business Overall, the App Store Derives Substantial Value from Strong, Bilateral Indirect Network Effects*

298. I now turn to the second fundamental feature of transaction platforms, the existence of strong, bilateral indirect network effects. Greater consumer participation makes the App Store more attractive to developers, and greater developer participation means more high-quality iOS apps that make the App Store and iOS devices more attractive.

299. Developers generally seek to grow their user base.⁶⁴⁸ In order to encourage consumers’ use of the App Store, Apple does not charge consumers access or transactions fees on the App Store platform. In addition, by providing the tools for developers to succeed, Apple has created an ecosystem with diverse and high-quality third-party apps.^{649,650} When developers sign up to participate in the Apple Developer Program, which requires a nominal fee of \$99 per year and the payment of a commission on paid downloads and in-app digital content, they can access an array of powerful tools to create high-quality apps and to offer them on the App Store,⁶⁵¹ which in turn increases the value of the platform. The availability of such apps makes iOS devices more attractive to potential users. An increasing user base, particularly one with a high propensity to spend,⁶⁵² in turn helps to attract additional app developers who are hoping to gain access to these users. Moreover, developers view iOS as their “monetization platform of choice,” as users have a higher propensity to spend on the iOS version of an app compared to its Android equivalent.⁶⁵³

⁶⁴⁸ APL-APPSTORE_09126673-774, at 686.

⁶⁴⁹ Silver, Stephen, “The revolution Steve Jobs resisted: Apple’s App Store marks 10 years of third-party innovation,” *Apple Insider*, July 10, 2018, available at <https://appleinsider.com/articles/18/07/10/the-revolution-steve-jobs-resisted-apples-app-store-marks-10-years-of-third-party-innovation>.

⁶⁵⁰ “The Symbiotic Relationship Between App Developers and Platforms: A Ten-Year Retrospective,” *ACT | The App Association*, available at https://actonline.org/wp-content/uploads/2018_ACT-App-Store-Ten-Year-Retro-Doc.pdf, accessed on September 14, 2020, at p. 4.

⁶⁵¹ “Purchase and Activation,” Developer, *Apple*, available at <https://developer.apple.com/support/purchase-activation>, accessed on February 10, 2021; “Membership Details,” Developer, *Apple*, available at <https://developer.apple.com/programs/whats-included>, accessed on February 10, 2021.

⁶⁵² Hitt Class Report, at Figure 16. Figure 16 shows the distribution of App Store spending by proposed class consumer accounts. Over █ percent of consumer accounts have spent \$100 or more, and over █ percent of consumers have spent \$1,500 or more through the App Store.

⁶⁵³ Okamoto Deposition, Vol.2, at 320:8-10 (“Have you heard from developers that iOS is the monetization platform of choice? A. Yes, I have.”). *See also* Okamoto Deposition, Vol.2, at 320:18-22 (“They explained when they took a look at a title, the similar title that was on Android and that was on iOS in general, users

300. To consumers, the availability of apps and services in the iOS ecosystem contributes to the appeal of Apple devices.⁶⁵⁴ The App Store facilitates the discovery and purchase of new apps and in-app content, and to remain viable Apple must ensure that customers are satisfied with their experience of using the App Store. When asked in a survey, users noted being satisfied with the variety, quality, and the “[e]ase of discovering new apps” in the App Store as reasons for their satisfaction.⁶⁵⁵ The App Store also generates indirect network effects by lowering search and transaction costs. For example, the App Store is curated, and apps are rated and ranked, which makes it easier for consumers to find interesting content.⁶⁵⁶
301. Moreover, the app review process provides consumers with reassurance that they do not have to concern themselves with potential safety and security hazards of un-reviewed and hence potentially fraudulent apps.⁶⁵⁷ For example, the process reviews apps for malware before they are uploaded onto the App Store.⁶⁵⁸ Even after apps have been approved, the

spent more money on the iOS application than they did on the Android application.”). *See also* Bhardwaj, Prachi, and Shayanne Gal, “Despite Android’s growing market share, Apple users continue to spend twice as much money on apps as Android users,” *Business Insider*, July 6, 2018, available at <https://www.businessinsider.com/apple-users-spend-twice-apps-vs-android-charts-2018-7> (“Apple makes developers a lot of money because its users are more likely to make in-app and App Store purchases compared to Android users.”).

⁶⁵⁴ “Form 10-K For the fiscal year ended September 28, 2019,” *Apple Inc.*, available at <https://www.sec.gov/Archives/edgar/data/320193/000032019319000119/a10-k20199282019.htm>, at p. 11 (“The Company believes decisions by customers to purchase its hardware products depend in part on the availability of third-party software applications and services.”).

⁶⁵⁵ APL-APPSTORE_10338255-278, at 259.

⁶⁵⁶ Fischer Deposition, Vol.2, at 333:1-6 (“[W]e have 1.8 million apps and browsing through that many pieces of content is quite a chore. So we’ve worked really hard to, you know, help curate through our -- our search experience, which is the primary way that people discover and download apps on the store.”).

⁶⁵⁷ Deposition of Trystan Kosmynka, Vol.2, February 3, 2021, at 313:14-18 (“The app review guidelines, the app review process, including ERBs, is designed to make sure that the App Store remains a safe and trusted place to get apps and a great opportunity for developers as well”) and 325:2-4 (“I think it’s well known at Apple what the purpose of the App Store is to be a safe and trusted place to get apps.”).

⁶⁵⁸



app review team periodically reruns apps to check if they pose any new safety concerns.⁶⁵⁹

A spam team investigates apps that receive complaints from customers or developers or are flagged by reviewers.⁶⁶⁰ [REDACTED]

[REDACTED].⁶⁶¹ Although the app review process can be burdensome for app developers, once reviewed and certified, a well-curated App Store with high-quality, bug-free iOS apps attracts more users and, ultimately, more potential business for app developers.^{662,663}

302. Platforms commonly impose restrictions of this sort, as several examples, including OpenTable, eBay, and Amazon discussed in detail earlier. Apple’s decision to focus on the quality of software offered to owners of its devices is also not uncommon among platforms that facilitate game transactions. Gaming console makers like Nintendo, Sony, and Microsoft all maintain strict control over the selection of games and apps on their

⁶⁵⁹ Kosmyinka Deposition, Vol.1, at 112:4-12 (“We, prior to review, we exercise apps through automation, so we’ll launch every app. And also, post review, we’ll periodically rerun those apps and determine if things have changed in significant ways. So, in the event that an app changes from, say, a friendly concept to one that is simply not safe, in some scenarios we’re able to determine that with the automation.”).

⁶⁶⁰ Kosmyinka Deposition, Vol.1, at 168:15-169:10 (“Q. So, prior to September ‘17, was there a spam team? A. It was the responsibility of the ARC team, App Review Compliance team. So, they would see complaints from customers, developers, etc., and take the appropriate action. [...] We would also get escalations from App Review as apps come in. So, for example, there’s an app that comes in, a reviewer rejects it, it happens to be that the app is live, already on the store, that would go to the App Review Compliance team as well. So, you’d have reviewer initiated escalations in addition to developer and customer. And then also, Apple employees outside of App Review could certainly get ahold of App Review to investigate, not only an app, but, say, a particular trend.”).

⁶⁶¹ Kosmyinka Deposition, Vol.1, at 121:19-122:8 (“Q. And what does the term sandbox mean? A. It’s apps that are installed from the App Store have access to their particular sandbox, such that they do not have access to things outside it. [...] If there’s a reason to suspect that an app has done something to, say, maliciously escape sandbox, we would investigate that.”).

⁶⁶² Fischer Deposition, Vol.2, at 321:13-322:4 (“[W]e have worked very hard over the past 12 and a half years to build and earn the trust of our customers, to create a safe and trusted place for them to discover and download apps, to build a great business opportunity for developers [...] And that’s part of our app review process that we that we review every single app and every single update that gets submitted to the store, over 100,000 apps and updates every single week that our app review team is looking at.”); Deposition of Phillip Shoemaker, Vol.1, January 12, 2021 (“Shoemaker Deposition, Vol.1”), at 80:12-16 (“Well, Android apps, in general, are less trustworthy. They are -- people don’t trust their store as much as they trust the Apple App Store. They purchase less on Android than they do on iOS. Prices are less on Android than iOS.”).

⁶⁶³ It is worth noting that Apple has strived to make the review process easier for developers. *See, e.g.*, Oliver Deposition, Vol. 2, at 426:19-25 (“In my experience, there has been a dramatic improvement of the App Review experience over the last eight years since I’ve been here. We’ve shortened the time that it takes to get through App Review down from, I think, roughly two weeks when I first started to, you know, often less than 24 hours for most developers today.”).

platforms.^{664,665} For example, Epic CEO Tim Sweeney describes Switch, PlayStation, and Xbox as “closed platforms,” as Nintendo, Sony, and Microsoft do not allow users to install software on their consoles outside of the platform’s official store.^{666,667} In the past, Microsoft has also prevented an N64 emulator, a piece of software enabling Nintendo games to run on other platforms, from being used on its Xbox console (though it allowed the emulator to be used on Windows PCs and mobiles).⁶⁶⁸ The Epic Games Store, Samsung, Microsoft (including Xbox), and Google Play all have application review

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- ⁶⁶⁴ EPIC_02435966-6012, at 969 (“6.3 Assessment and Quality Assurance of PlayStation Compatible Products. Publisher will comply with the requirements and related process for assessment and format quality assurance of PlayStation Compatible Products and Advertising Materials, on a product-by-product basis, as specified in the Guidelines. All Licensed Products must successfully pass SCE’s assessment and format quality assurance testing before distribution. SCE may require other PlayStation Compatible Products to undergo assessment and format quality assurance testing, in its sole discretion. SCE may withhold approval of a PlayStation Compatible Product that does not conform to the Guidelines, as determined by SCE in its sole discretion”).
- ⁶⁶⁵ EPIC_02631372-383, at 372, 374 (*See* 2.2 “Final Certification,” 2.3 “Content Rating,” and 3.4 “Disablement.”).
- ⁶⁶⁶ Sweeney Deposition, at 50:22-51:19 (“Q. So each of the consoles, for example, PlayStation, Xbox, Nintendo Switch, those are what you would call a closed system, correct? A. Yes. [...] Q. And can you describe for me what you mean by ‘closed platforms’ in reference to these consoles? A. I think there’s a lot of history associated with the term. The primary characteristic that I recall is the inability of developers to distribute software directly to their -- to consumers and the inability for consumers to install software of their choosing from sources of their choosing either through outright prohibitions or substantial obstructions.”); and 122:18-25 (“Q. And do Microsoft, Nintendo or Sony permit sideloading onto their consoles? A. Use of these consoles by developers in the process of developing a game aside, I do not believe any of -- I’m not aware that any of these current console platforms enable users to install software on their device from outside of the platform’s official store.”).
- ⁶⁶⁷ Epic CEO Tim Sweeney does not consider Google’s Android a fully open platform either. *See* Sweeney Deposition, at 52:7-12 (“Google significantly impedes the process of installing, updating and using software from non-Google Play sources, in particular independent sources, to the point where it does not have the characteristics one would fully expect from an open platform.”).
- ⁶⁶⁸ Orland, Kyle, “Epic’s battle for ‘open platforms’ ignores consoles’ massive closed market,” *ArsTechnica*, August 14, 2020, available at <https://arstechnica.com/gaming/2020/08/as-epic-attacks-apple-and-google-it-ignores-the-same-problems-on-consoles/>; Orland, Kyle, “How the Universal Windows Platform briefly let an N64 emulator sneak onto the Xbox One [Updated],” *ArsTechnica*, September 27, 2016, available at <https://arstechnica.com/gaming/2016/09/how-the-universal-windows-platform-let-an-n64-emulator-sneak-onto-the-xbox-one/>.

processes and moderate the app content.⁶⁶⁹ Xbox and PlayStation also have extensive rules governing how user data can be used by developers.⁶⁷⁰

303. Developers appear to recognize that the review process, while onerous, creates value. For example, some developers expressed dissatisfaction with the limited review process in the Android Market Place, which initially did not even have an approval process.⁶⁷¹ One developer noted, “[Android has] no review process. Yes, it’s easier on the developer, but it’s detrimental to the whole ecosystem.”⁶⁷² Another remarked, “The Android Market Place is unregulated, and swamped with poor quality Apps.”⁶⁷³ While Google may have initially believed that its unregulated approach would be attractive to developers, the opposite seems to be true—many developers found Google’s approach unappealing.⁶⁷⁴ Google has since been tightening its app screening process, moving in the direction of the App Store. In

⁶⁶⁹ See, e.g., “Get Started in Galaxy Store,” *Samsung Developers*, available at <https://developer.samsung.com/galaxy-games/get-started-in-galaxy-store.html>, accessed on February 2, 2021. See also, “Microsoft Store Policies,” *Microsoft*, October 1, 2019, available at <https://docs.microsoft.com/en-us/windows/uwp/publish/store-policies>; Samat, Sameer, “Listening to Developer Feedback to Improve Google Play,” *Android Developers Blog*, September 28, 2020, available at <https://android-developers.googleblog.com/2020/09/listening-to-developer-feedback-to.html>; “Xbox Live Creators Program,” *Xbox*, available at <https://www.xbox.com/en-US/developers/creators-program>, accessed on February 2, 2021 (“While we want to give developers more choice in how they bring their games to Xbox Live, we have enforcement procedures in place to ensure developers and their games adhere to our Store policies and Developer Code of Conduct - inappropriate content will be flagged and reviewed through our certification system and the Store is regularly audited.”); Sweeney Deposition, at 185:22-23 (“People at Epic review all games that we distribute.”).

⁶⁷⁰ “Xbox Live Policies for PC and Mobile,” *Microsoft*, December 12, 2020, available at <https://docs.microsoft.com/en-us/gaming/xbox-live/policies/live-policies-pc> (“Do not share services or user data (even if anonymous, aggregate, or derived data) to any ad network, data broker or other advertising or monetization-related service.”); “PlayStation Global Developer & Publisher Agreement,” *Sony Computer Entertainment*, March 23, 2017 available at <https://www.sec.gov/Archives/edgar/data/946581/000162828017005833/ex10-48.htm> (“to limit [...] its processing of SIE Personal Information strictly to those purposes defined in the Guidelines or in writing by SIE and for no other purpose.”).

⁶⁷¹ Perenson, Melissa, “Google Launches Android Market,” *PCWorld*, October 22, 2008, available at https://www.pcworld.com/article/152613/google_android_ships.html.

⁶⁷² APL-APPSTORE_09324150-288, at 241.

⁶⁷³ APL-APPSTORE_09324447-608, at 559.

⁶⁷⁴ APL-APPSTORE_09324150-288, at 241.

2015, Google Play added a new app review system before an app can be distributed,⁶⁷⁵ and in 2019 it increased review times for new developers.⁶⁷⁶

304. Atari provides a cautionary tale of the pitfalls of insufficient oversight of app developers by a platform owner. In the 1980s, it made available a deluge of third-party games for its console, many with glitches, resulting in widespread customer dissatisfaction and demands for refunds.⁶⁷⁷ Learning from this experience, Nintendo began to restrict the game software that could run on its consoles, which became a standard practice in the industry.⁶⁷⁸ GetJar, a mobile app distribution platform, is another example that illustrates the tradeoffs between fast approval and app quality: its advertised “minimal requirements” for developers to publish on its platform have resulted in the distribution of apps with viruses.^{679,680}
305. The App Store does not allow any “store within a store,” in which developers could direct app users to other apps.⁶⁸¹ Such stores could direct consumers to apps that had not gone

⁶⁷⁵ Cunningham, Andrew, “Google Play apps and updates are now subject to a review process,” *ArsTechnica*, March 17, 2015, available at <https://arstechnica.com/gadgets/2015/03/google-play-apps-and-updates-are-now-subject-to-a-review-process/>.

⁶⁷⁶ Samat, Sameer, “Improving the update process with your feedback,” *Android Developers Blog*, April 15, 2019, available at <https://android-developers.googleblog.com/2019/04/improving-update-process-with-your.html> (“Separately, we will soon be taking more time (days, not weeks) to review apps by developers that don’t yet have a track record with us. This will allow us to do more thorough checks before approving apps to go live in the store and will help us make even fewer inaccurate decisions on developer accounts.”).

⁶⁷⁷ Orland, Kyle, “Epic’s battle for ‘open platforms’ ignores consoles’ massive closed market,” *ArsTechnica*, August 14, 2020, available at <https://arstechnica.com/gaming/2020/08/as-epic-attacks-apple-and-google-it-ignores-the-same-problems-on-consoles/>; Trautman, Ted, “Excavating the Video-Game Industry’s Past,” *The New Yorker*, April 29, 2017, available at <https://www.newyorker.com/business/currency/excavating-the-video-game-industrys-past>.

⁶⁷⁸ Orland, Kyle, “Epic’s battle for ‘open platforms’ ignores consoles’ massive closed market,” *ArsTechnica*, August 14, 2020, available at <https://arstechnica.com/gaming/2020/08/as-epic-attacks-apple-and-google-it-ignores-the-same-problems-on-consoles/>.

⁶⁷⁹ “GetJar Developer Zone: Publishing,” *GetJar*, available at <https://developer.getjar.mobi/>, accessed on July 12, 2021 (“Upload your apps with minimal requirements and NO costs.”).

⁶⁸⁰ “Remove Android:Plankton [PUP] Virus from Android Device after Downloading Apps from GetJar,” *Android Advices*, April 11, 2012, available at <https://androidadvices.com/remove-androidplanktona-pup-virus-android-device-downloading-apps-getjar/>.

⁶⁸¹ See APL-APPSTORE_10137264-342, at 279 (“(In-App Purchase API), such Applications may not function as a distribution mechanism for software and may not include feature or functionality that create or enable a software store, distribution channel or other mechanism for software delivery within such Applications”). Under Apple’s review guidelines, it is unacceptable for apps to “[create] an interface for displaying third-party apps, extensions, or plug-ins similar to the App Store or as a general-interest collection.” See “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on

through the review and curation process, which poses safety concerns, and can be a device to avoid paying commissions on in-store sales. As Trystan Kosmynka, Apple’s director of app review process, testified, “[t]he goal of the store is to provide a safe experience for customers to find great apps and great games, and so having additional stores within that means that we wouldn’t be able to have the curation and the review that’s required to have our store be the safest place to get apps.”⁶⁸² While some developers may chafe at this restriction, according to Epic CEO Mr. Sweeney, the fairness of a policy that bans stores within a platform’s store depends on “whether such a decision would have overall positive consumer benefits or negative consumer benefits and follows the expectations of consumers.”⁶⁸³ The “store within a store” restriction ensures that the apps that end users see are those ranked by reviews, ratings, and downloads.⁶⁸⁴

August 3, 2021; Shoemaker Deposition, Vol.1, at 171:14-20 (“Q. We talked earlier about a store within a store [...] And you said that Apple had a general policy not allowing that; right? A. That’s correct.”). *See also* Borck, Jonathan, Juliette Caminade, and Markus von Wartburg, “Apple’s App Store and Other Digital Marketplaces,” *Analysis Group*, July 2020, available at https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf, at p. 12 (“The most prominent app stores and software distribution platforms (Google Play Store, Amazon Appstore, Samsung’s Galaxy Store, Microsoft Store, App Store) all use policies that require developers to pay commission fees, and use the platform’s in-app payment system to purchase in-app digital products, with certain carve-outs for multi-platform apps. Additionally, most of those stores explicitly require that developers do not direct app users to make purchases outside of the store.”).

⁶⁸² Kosmynka Deposition, Vol.1, at 69:12-17 (“The goal of the store is to provide a safe experience for customers to find great apps and great games, and so having additional stores within that means that we wouldn’t be able to have the curation and the review that’s required to have our store be the safest place to get apps”).

⁶⁸³ Sweeney Deposition, at 72:19-73:4 (“Q. So is it fair for Sony to permit developers or to -- is it fair for Sony to decide that it will not permit developers to have their own stores within its Xbox store? [...] [A.] I think the question of fairness goes to whether such a decision would have overall positive consumer benefits or negative consumer benefits and follows the expectations of consumers, and in the case of consoles, it’s not really clear to me.”).

⁶⁸⁴ Shoemaker Deposition, Vol.1, at 173:8-19 (“Now, when you have a store in a store or these app recommendation apps, you have third parties meddling with that and people can pay to place. So let’s say I go to one of these app recommendation apps and I say I’ll give you \$10,000 put me at the top of your list, they’ll put you at the top of their list and suddenly that terrible app is trending. And that app is changing the Apple charts and people are downloading this piece of garbage over and over and over”).

306. Other platforms impose restrictions similar to those imposed by the App Store.⁶⁸⁵ Google Play and Samsung Galaxy Stores prohibit apps from having a store-within-a-store.⁶⁸⁶ Game platforms including Xbox, PlayStation, and Steam have similar restrictions prohibiting any functionality from or reference to any other store, or to any other facility for making purchases or payments.⁶⁸⁷

3. *The App Store Has as Its Main Purpose the Facilitation of Observable Transactions between Developers and End-Users*

307. The App Store facilitates transactions between end users and developers—like Amex, the App Store neither buys nor sells content; it facilitates transactions involving a range of products. Transactions between iOS users and developers on the App Store include user downloads of apps that are supplied by developers on the App Store, updates of apps that are supplied by developers on the App Store, and in-app purchases of additional content by iOS users. Developers, consumers, and Apple benefit from the App Store only when transactions occur.

308. Similar to other transaction platforms, the App Store simultaneously connects iOS users and developers and facilitates observable transactions between these two sides. The App

⁶⁸⁵ Sweeney Deposition, at 85:1-3 (“[M]y understanding is that Apple and the three major console platforms each prohibit distribution of software stores within their store”).

⁶⁸⁶ See, e.g., “Google Play Developer Distribution Agreement,” *Google Play*, November 17, 2020, available at https://play.google.com/intl/en_us/about/developer-distribution-agreement.html (“4.5 You may not use Google Play to distribute or make available any Product that has a purpose that facilitates the distribution of software applications and games for use on Android devices outside of Google Play.”). See also “App Distribution Guide,” *Samsung Developers*, available at <https://developer.samsung.com/galaxy-store/distribution-guide.html>, accessed on February 2, 2021.

⁶⁸⁷ VALVE 000028-034, at 029 (“No Other In-Application Stores. The parties agree that Applications distributed via Steam will not include functionality from or links or references to any store other than Steam, or any other facility for making purchases or payments.”); “Microsoft Store Policies,” *Microsoft*, October 1, 2019, available at <https://docs.microsoft.com/en-us/windows/uwp/publish/store-policies> (“Your app may promote or distribute software only through the Microsoft Store ... ‘Store’ or ‘Microsoft Store’ means a Microsoft owned or operated platform, however named, through which Apps may be offered to or acquired by Customers. Unless otherwise specified, Store includes the Microsoft Store, the Windows Store, the Xbox Store, Microsoft Store for Business, and Microsoft Store for Education.”); EPIC_02435966-6012, at 976 (“Distribution of any PlayStation Compatible Product is subject to written approval by SCE in its sole discretion. Such approval may be subject to assessment and testing requirements pursuant to Section 6.3, evaluation of the commercial aspects of the PlayStation Compatible Product, and to commercial or other conditions required by SCE (following such evaluation or otherwise), including a requirement that a PlayStation Compatible Product must be distributed through PSN [PlayStation Now].”).

Store also exhibits particularly pronounced indirect network effects: the value to developers of participation on the App Store increases with the usage of the App Store by iOS users.

309. As such, the App Store’s price structure must reflect Apple’s view of relative price sensitivities as well as the nature and strength of indirect network effects on the two sides. In order to offer apps in the App Store, developers must pay a nominal annual access fee (\$99) to join the Apple Developer Program and agree to pay a commission on the purchase price of paid downloads or in-app purchases of digital content. When transactions involving apps they have offered on the App Store occur, developers are charged commissions that vary with the nature of the transactions.⁶⁸⁸ Downloads of apps can either be free or paid for by the consumer. Apple does not charge money for apps that the developer offers free.
310. IAP is Apple’s secure and centralized system used to record sales and collect commissions on in-app purchases of digital content,⁶⁸⁹ facilitating the existence of the Freemium and Paymium Models of monetization for developers. IAP gives Apple the ability to obtain and provide to both parties a “reasonably high level of confidence that a digital good or service has been delivered,”⁶⁹⁰ as the delivery of digital goods in the App Store occurs instantly after payment. On the other hand, Apple has no way to obtain or provide any level of confidence about the delivery of a physical good.⁶⁹¹ In addition, Apple is unwilling to get involved in the return of physical goods, because unlike digital returns, physical returns are

⁶⁸⁸ The Apple Developer Program annual fee is \$99, and membership allows developers to submit their apps for distribution on the App Store. Apple keeps 30 percent of sales proceeds (15 percent if the developer is enrolled in the App Store Small Business Program) and 15 percent for certain qualifying subscriptions. *See* “Purchase and Activation,” *Apple*, available at <https://developer.apple.com/support/purchase-activation>, accessed on February 10, 2021 (“The Apple Developer Program annual fee is 99 USD.”); *See also* “Membership Details,” *Apple*, available at <https://developer.apple.com/programs/whats-included>, accessed on February 10, 2021 (“Keep 70% of your sales proceeds (85% if you’re enrolled in the App Store Small Business Program) and 85% for qualifying subscriptions.”).

⁶⁸⁹ Schiller Declaration, at ¶¶ 32-33.

⁶⁹⁰ Haun Deposition, Vol.1, at 193:4-8 (“That the IAP, as designed for digital goods and services, gives us a reasonably high level of confidence that that digital good or service has been delivered. Using IAP for a physical good, we have no such knowledge.”).

⁶⁹¹ Shoemaker Deposition, Vol.1, at 148:15-21 (“With digital goods, we could tell if someone made the purchase, if the content was ultimately delivered to the user. There’s a lot of things we can do to verify it, but things outside of our control, like physical goods or physical services, we figured that in-app purchase was not appropriate for those.”).

“very labor intensive” and “messy.”⁶⁹² Moreover, unlike digital goods, physical goods are not used on Apple devices.

311. A developer can also allow users of multi-platform apps to access features of the app that they obtained on another platform without buying them again through IAP, as long as it offers those features as in-app purchases within the iOS app.⁶⁹³ For example, a user who purchases virtual tokens in the Windows PC version of a game can access those tokens while playing the iOS version of the game, without having to purchase anything through the App Store, as long as the developer also makes the tokens available for purchase in the iOS version of the game. As the director of Apple’s developer technical support team explained, as such features “by their nature are not reliant on a particular application or platform for a consumer to perform a task or service [...] it makes sense that the customer has the same characteristics in that well-defined world on each platform they may interact or have a window into that world at any particular time.”⁶⁹⁴ An internal document demonstrates that Apple prioritizes user experience by ensuring that users can experience the same functionality across different platforms, including iOS.⁶⁹⁵

⁶⁹² Okamoto Deposition, Vol.2, at 336:6-11 (“Because it’s a very labor intensive thing. You would have to receive the item, you would have to return it back to the -- the vendor. They would have to ship out the correct product or provide a credit, so it’s complex. And against a complete digital marketplace, it’s kind of messy.”).

⁶⁹³ “App Store Review Guidelines,” *Apple*, available at <https://developer.apple.com/app-store/review/guidelines/>, accessed on August 3, 2021.

⁶⁹⁴ Haun Deposition, Vol.1, at 79:9-24 (“There are certain behaviors in software applications that by their nature are not reliant on a particular application or platform for a consumer to perform a task or service [...] it makes sense that the customer has the same characteristics in that well-defined world on each platform they may interact or have a window into that world at any particular time.”).

⁶⁹⁵ APL-APPSTORE_09976511-515, at 513-514 (“[W]e also have to allow apps that are cross platform to work properly for users. If users play Minecraft on for example the PC, and purchase goods there, and then run Minecraft on iOS or Apple TV with the same log on they would expect those goods to be there as well. I don’t see any other way around this. If anyone feels otherwise please say so. I think this is a big deal”).